

# Municipal Journal

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JUNCTION OF CAST IRON AND STEEL PIPE LINES. 76 x 60-INCH BRANCH.

## AQUEDUCT TUNNEL AND CEMENT LINED PIPE

Of the Metropolitan Water and Sewerage Board of Massachusetts—Pressure Tunnel Lined with Concrete  
—Steel Pipe Lined with Cement Mortar

By A. O. DOANE, Division Engineer, Metropolitan Water Works.

THE Metropolitan Water and Sewerage Board, a State board which has control of the construction and maintenance of the systems supplying water to Boston and many of the neighboring cities and towns, has recently constructed in the city of Newton a pressure tunnel in rock and a cement-lined steel pipe, which form part of the Weston aqueduct supply main which conveys water by gravity from the Weston aqueduct to the low-service distributing mains near Chestnut Hill reservoir. The tunnel is connected at each end with a 60-inch cast iron pipe line by means of 80-inch riveted steel pipe lined with cement mortar and covered with concrete.

The tunnel is 2,042 feet long and 76 inches in diameter inside

of the concrete lining. The 80-inch steel pipe is lined with cement mortar 2 inches in thickness, making it also 76 inches inside of the lining. The eastern section of steel pipe is 161 feet long and the western section 202 feet long. The tunnel and steel pipe were constructed of larger capacity than the other part of the supply main, which is 60-inch cast iron pipe, in order to convey in addition the water from another pipe line which is to be built when the conditions demand it.

### CONSTRUCTION OF THE TUNNEL.

The average diameter of the tunnel, before lining, was about 10 feet. The clearance circle, inside of which no rock was allowed to project, was 7 feet 10 inches in diameter, making the



PLACING CONCRETE IN ARCH OF TUNNEL SECTION.

minimum thickness of concrete lining 9 inches. The tunnel was given a slope of 0.5 of a foot in 1,000 feet.

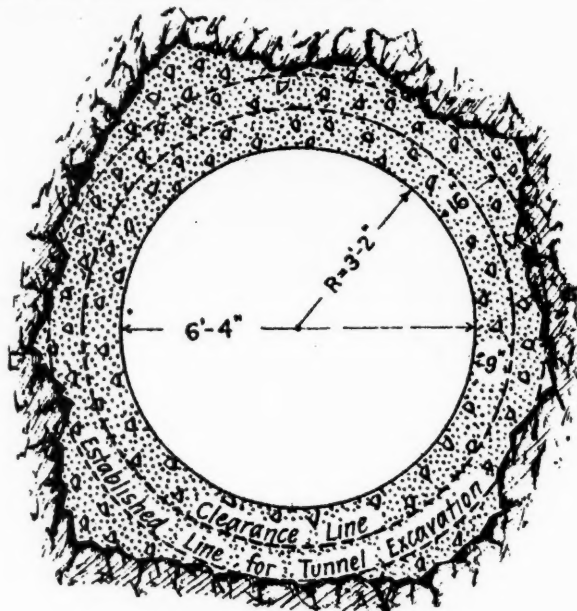
Work was commenced at the west portal on July 16, 1910, and at the east portal on September 9, 1910. On December 28 of the same year the headings met, with an error of only  $\frac{1}{2}$  inch in line and  $\frac{3}{4}$  inch in grade. Work was stopped for the winter on December 31, 1910, and started again on March 22, 1911, and the whole work, including the steel pipe line, was finished in October, 1911.

The tunnel was driven from two headings, with two shifts at each heading. The amount of rock excavated averaged 3 cubic yards per linear foot at the east heading, which was in basalt, and 2.7 cubic yards at the west head, in conglomerate. The progress averaged 10.5 linear feet per 24-hour day at the east heading and 9.6 linear feet at the west heading.

The force employed was 12 men and one mule in each shift at each heading. Machinery for carrying on the work, consisting of a steam plant, air compressor, dynamo for lighting the tunnel and steam crusher, was installed at each end of the tunnel. The muck was brought out of the tunnel through small steel cars running on a narrow-gauge railway, which cars were hauled by mules. This railway was also used to convey concrete for the lining operations. A large proportion of the excavated rock was crushed and used in the concrete. The concrete for the lining was mixed by two Smith machines, one at each portal, which were erected on elevated platforms

so that the concrete could be dumped directly into the cars.

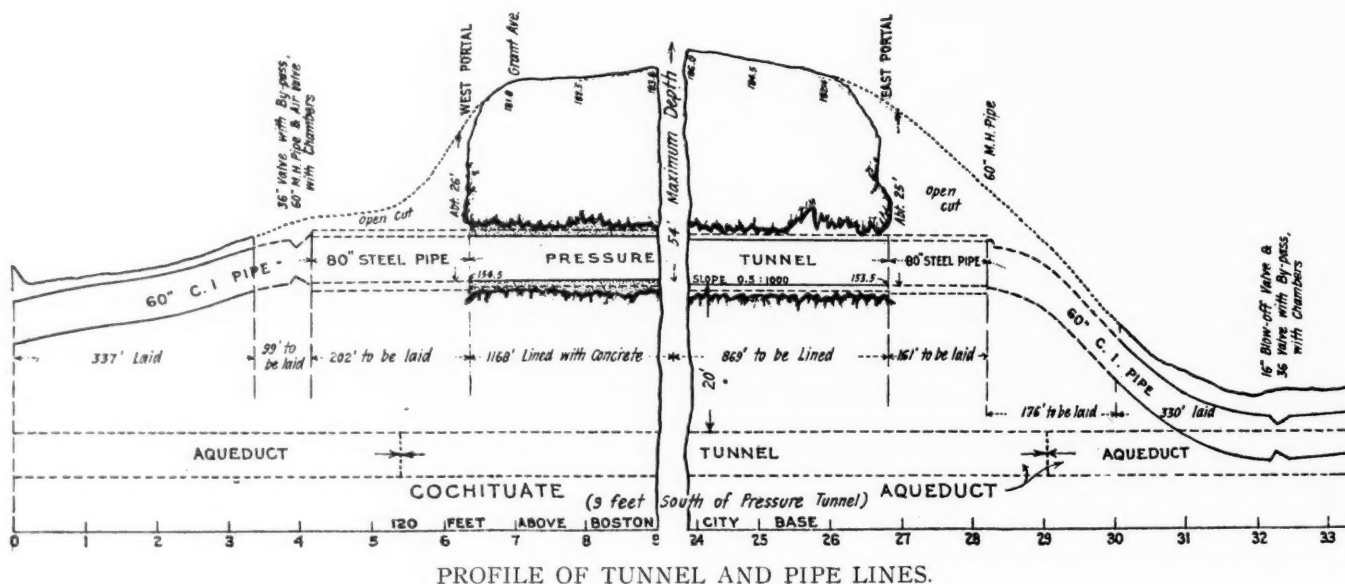
One hundred and fifty feet of Blaw collapsible steel forms were used. They were composed of steel ribs and plates, the former made rigid without the use of cross braces, so as not to interfere with carrying material through the tunnel while they were in place, and these were covered with curved steel plates which could be built up on the outside of the ribs and bolted to them as the work progressed. The ribs did not come together at the bottom, but a space of about 30 inches was left between the ends. The bottom concrete was built up from the rock bottom before the forms were set up, and the lower ends of the form ribs were supported by benches of this concrete. The lower side plates were then put in place and the concrete was filled in; side plates being added and concrete placed behind them until the top of the arch was reached, when a key plate was shoved in from the end.



TYPICAL TUNNEL SECTION.

The tunnel lining averaged 1.9 cubic yards per linear foot in the eastern section and 1.6 cubic yards in the western section. The concrete lining was placed with an average speed of 35 linear feet per 24-hour day. The forces worked in three shifts; two of these, each of which contained 21 men and three mules, mixing and placing concrete, and the third shift, of 11 men, setting the forms.

As the tunnel is to be used under a hydrostatic pressure of



PROFILE OF TUNNEL AND PIPE LINES.



about 20 pounds per square inch, great care was used to make the concrete water tight. The materials for the concrete were mixed in the following proportions: 380 pounds of Portland cement, 8 cubic feet of loosely compacted sand, 15 cubic feet of crushed stone that would pass through a ring 2 inches in diameter, but would not pass through a ring  $\frac{1}{4}$  inch in diameter. Great care was used in filling all cavities in the rock by ramming the concrete as thoroughly as possible. Crude oil was used to lubricate the forms to prevent the concrete from sticking to them.

The track for the concrete cars was laid on wooden ties supported at the ends by the forms. At the point where the concrete lining was being placed, steel plates were laid on the ties and the concrete was dumped from the cars upon these and shoveled from them into the forms. After the forms were removed, the portion of the invert which had not been lined at the first operation was concreted.

The tunnel was located 9 feet to one side of and about 20 feet above the old tunnel of the Cochituate aqueduct, built in 1848, and in several instances the excavation broke into the old shafts, which had been filled with material excavated from the old tunnel. This material gave trouble by running into the new excavation, causing a serious settlement of the surface. Timbering was put in the old shafts to hold up the fill, and the portion of the shafts adjacent to the new tunnel was filled with concrete.

As it proved very difficult, if not impossible, to fill all the voids when placing the concrete in the tunnel lining,  $1\frac{1}{2}$ -inch pipes were placed in all cavities in the rock which were likely to prove difficult to fill with concrete. These pipes had a coupling on one end, the face of the coupling being set  $\frac{1}{4}$  inch back of the finished surface of the lining. These pipes extended to the highest point in the cavity, leaving about  $\frac{1}{2}$  inch clearance between the end of the pipe and the rock. After the concrete lining was placed and thoroughly set, Portland cement grout was forced in by means of a Canniff grouting machine, consisting of a steel tank having a bottom outlet for the grout. Compressed air under about 60 pounds per square inch pressure was used to force the grout into the cavity through a hose connected to the coupling on the end of the  $1\frac{1}{2}$ -inch pipe left for the purpose. A small air pipe entering at the bottom of the tank served to convey compressed air to mix the grout and keep it stirred while being used. The grout for this operation was mixed in the proportion of 380 pounds of cement to 4 cubic feet of sand. The heavy air pressure forced the cement into every crevice in the rock, com-



GROUTING MACHINE IN TUNNEL.

pletely filling all the voids. It also filled any porous places or pin holes in the concrete lining of the tunnel. Concrete cut-off walls were put in, spaced so that the grout did not have to be forced more than 10 feet from the pipe. The maximum quantity of grout put in by this machine, which has a capacity of 2 cubic feet, was 270 cubic feet per day.

#### CONSTRUCTION OF THE STEEL PIPE.

The specifications for the steel pipe provided that the steel plates should fulfil requirements for flange steel and rivets for



JUNCTION OF CONCRETE-COVERED STEEL PIPE AND WEST END OF TUNNEL.

extra soft steel, as given in the standard specifications for Open Hearth Boiler Plate and Rivet Steel, adopted August 16, 1909, by the American Society for Testing Materials, and all tests were to be made in accordance with these specifications.

The pipe was constructed in sections 20 feet  $1\frac{1}{2}$  inches long, made up of three courses alternately large and small, each consisting of one plate  $\frac{1}{8}$ -inch thick. The longitudinal seams were double riveted, and the circular seams single riveted. All calking edges were beveled by a special planer. All seams were calked both inside and outside. All shop riveting was done by hydraulic riveter.

The completed sections were tested at the shop by bolting a dished and flanged head at each end of a section, calking the joints between pipe and head with oakum, and applying a hydraulic pressure of 40 pounds per square inch. Any leaks found were stopped by calking.

After testing, the pipe was thoroughly cleaned and painted, both inside and outside, with a thick coat of Portland cement and water, mixed in the proportions of 10 pounds of cement to 5 pounds of water. Circular wooden ribs and lagging were placed inside the pipe, to keep it in cylindrical shape during carting and handling.

Steel pads  $\frac{1}{2}$  inch in thickness and tapped for 2-inch pipe plugs were riveted over holes cut in plates, two in each course, and spaced 40 inches apart. These holes were used to pass rivets for the field joints and later for the pouring of the grout lining. They were finally closed by cast steel plugs. Field riveting was done by hand hammers, and field joints calked by hand tools.

Before placing the concrete covering around the outside of the pipe, the surface of the steel was cleaned by sand blast which removed all cement, dirt and mill scale, leaving a clean gray surface. The pipe was then given a coating of Portland cement and water, mixed in the same proportions as specified for the shop coating.

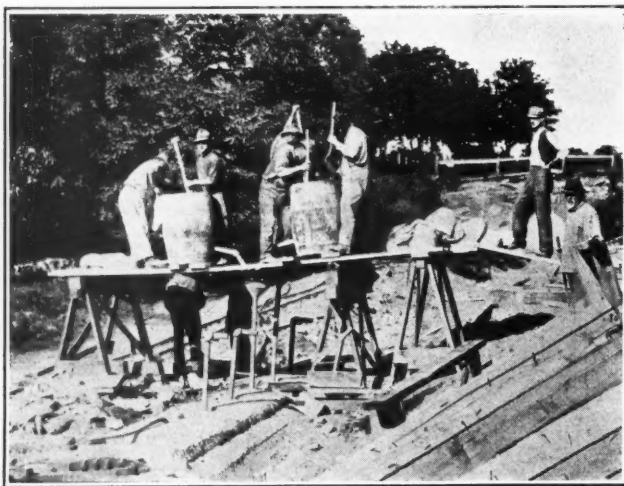
In order to avoid serious damage to the concrete covering, which might be caused by a change of shape under hydraulic

pressure, the pipe was brought to true circular form by means of heavy wooden circular segments, well braced and wedged. The outside concrete was then carried up uniformly on both sides of the pipe at the same time. The tendency of the pipe to float was counteracted by bracing it against the walls of the excavation and by pouring the concrete slowly.

The concrete on the outside had a section such as is commonly used in aqueduct construction, except that the top and sloping sides were flat surfaces. The concrete on the top of the pipe was 6 inches thick. Pockets were left in the concrete over the 2-inch holes, to be used in placing the cement lining.

The forms for the mortar lining were made of steel plate in sections 7 feet long, each section made up of five segments having internal angle iron flanges on the edges. These were bolted together to make the longitudinal joints. The key at the top of the arch was made of wood about 4 inches wide placed between the iron flanges.

The end joint was made of a ring of 2-inch rubber hose, with special couplings at the ends adjoining the key joint at the top of the arch. The hose was filled with water under 60 pounds



POURING MORTAR LINING INTO STEEL PIPE.

pressure, which forced the wall of the hose against the steel pipe on one side and the steel plate of the form on the other, and made a tight joint which held the mortar very well.

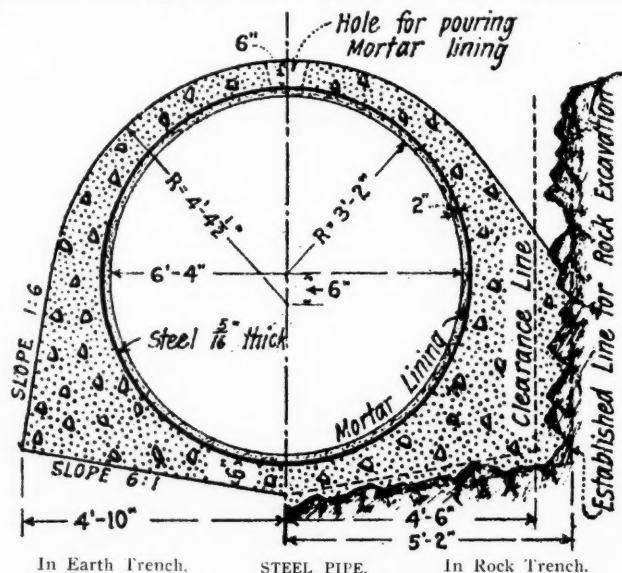
Set screws were provided to adjust the distance between the forms and the inside of the pipe. Three sections of center were used, making up a length of 21 feet. To start the work, a length of 21 feet was poured at one time; after this two sections, or 14 feet, were poured each day. The head form was left in place and the two rear sections were struck, carried forward and set up again.

The mortar for the lining was mixed in the proportions of



MORTAR LINING IN STEEL PIPE AND FORMS FOR THE SAME.

380 pounds of Portland cement to 7 cubic feet of sand. The materials were mixed dry on a platform, placed in bags and taken to the mixing barrels, which were placed on a platform over the steel pipe and sufficiently above it to allow the mixture



to flow from a pipe at the bottom of the barrel to a funnel in the top of the pouring pipe. Four of the 2-inch openings in the top of the pipe were used in pouring each section. Pieces of 2-inch pipe 4 feet long were screwed into the two middle holes and pieces of pipe 3 feet long were connected to the end holes. The middle pipes were used to pour through and the operation was continued until the mortar flowed out of the tops of the 3-foot pipes.

While the process of pouring was going on, men on the inside of the pipe pounded the centers to start away air bubbles which adhered to the surface of the iron. The mortar was also thoroughly churned with rods in the pouring and vent pipes. The mortar was mixed to a consistency that would flow satisfactorily and fill all voids in the mould. Nine men would mix the materials and pour a 14-foot section of lining in 2½ hours.

After the forms were removed, the holes in the lining made by adjusting screws were filled with mortar, and any defects in the coating were patched. The whole interior surface of the tunnel and mortar-lined steel pipe was then given a coating of Portland cement grout, applied with brushes.

Special air valves, consisting of a 2½-inch check valve, opening inward (to avoid any chance of collapsing the steel pipe in case of a sudden emptying of the line), and a 2-inch ordinary gate valve, to let air out when filling the pipe, were installed, one on the branch at the connection of the steel and cast iron pipes at the east end, the other at the corresponding location at the west end.

The quantities and prices of some of the principal items of the work are as follows:

Item.	Quantity.	Unit Price.
Excavating tunnel.....	2,042 lin. ft.	\$25.00
Crushing stone.....	9,800 cu. yds.	.75
Concrete masonry in tunnel.....	3,100 cu. yds.	10.00
Cement grout in tunnel.....	300 cu. yds.	12.00
Cement mortar lining for steel pipe....	362 lin. ft.	5.50
362 feet of steel pipe, 80 inches in diameter.....		\$3,650.00

The tunnel and pipe line were designed and constructed under the direction of Mr. Dexter Brackett, member American Society Civil Engineers, Chief Engineer of the Metropolitan Water Works. Mr. W. E. Foss, Assistant to the Chief Engineer, had general supervision of the work, with Mr. Clifford Foss, Assistant Engineer, in immediate charge. Joseph Hanreddy, of Chicago, was the contractor. The Hodge Boiler Works, of Boston, were contractors for constructing the steel pipe and delivering it at the Chestnut Hill pipe yard, from which point it was teamed by Joseph Hanreddy, who laid it and did the field riveting.



## PROTECTING STEEL PIPES

### Applying Inside Lining of Cement Mortar and Outside Protection of Concrete—Methods of Applying—Results—Contract Prices

Abstract of Paper Before the New England Water Works Association by Alfred D. Flinn, Department Engineer, Board of Water Supply, New York City

ONE of the siphons of the aqueduct under construction to supply New York City with water from the Catskill mountains was described in our issue of August 23. At that time the steel work of the siphon had not been completed, and consequently only a brief description was given of the protection, both inside and out, which was contemplated. In a paper before the New England Water Works Association, Alfred D. Flinn, Department Engineer of the Board of Water Supply of New York City, described the methods employed for furnishing inside and outside protection to this siphon and to the others along the line of the aqueduct. Of these siphons there are fourteen, ranging in length from 608 feet to 6,671 feet, the total length of all the siphons being 33,031 feet. About one-fourth of the total length has a finished inside diameter of 10 feet 11 inches, about one-fourth a diameter of 9 feet 5 inches and about one-half a diameter of 9 feet 2 inches.

While preparing the plans, investigations and experiments were conducted to determine the material and method which it would be best to adopt for protecting the steel. Apparently none of the pipe coatings commonly used possessed qualities giving it more than a few years' useful life when in contact with the water and soil which had to be considered in this case. One or two cases of the use of Portland cement mortar on a small scale and wide experience in reinforced concrete construction suggested the use of cement for this purpose; and after some study it was decided to jacket the siphons outside with rich concrete, with a minimum thickness of 6 inches, and line them with Portland cement mortar 2 inches thick. An effort was then made to find the most economical and practicable methods for the various steps in covering and lining the pipe, with a view also to obtaining intimate, complete and permanent adhesion in spite of the unavoidable changes in shape and the elastic distortions of the pipe.

Mortar lining experiments were made on a steel pipe 9 feet in diameter and 12 feet long. This was lined by plastering with metal reinforcement of several styles, by plastering with terra cotta and cement blocks or tiles, and by pouring grout or very thin mortar into the space between a cylindrical steel form and the interior surface of the pipe. These experiments seemed to show that no combination of plasterer's skill with various kinds of cement mortar, reinforced or unreinforced, gave linings that were adequate; besides which this method was expensive. Bedding tiles of terra cotta or mortar, about  $\frac{3}{4}$  to  $\frac{7}{8}$  inch thick and 6 by 8, 6 by 12, and 8 by 12, on mortar applied directly to the pipe surface, and, after setting, building up the lining to the required thickness with successive coats of mortar troweled on, was much more satisfactory, but also expensive. The grouting method proved by far the most satisfactory and least expensive and was made the basis of the specifications. It had the advantage of producing a monolithic lining, which was considered desirable, especially as it avoided layers or laminae, since it is well known to be difficult to cause one layer of Portland cement mortar or concrete to adhere absolutely and permanently to another without expensive and troublesome precautions. This method also gave promise of being feasible in actual construction, and was adopted for the work.

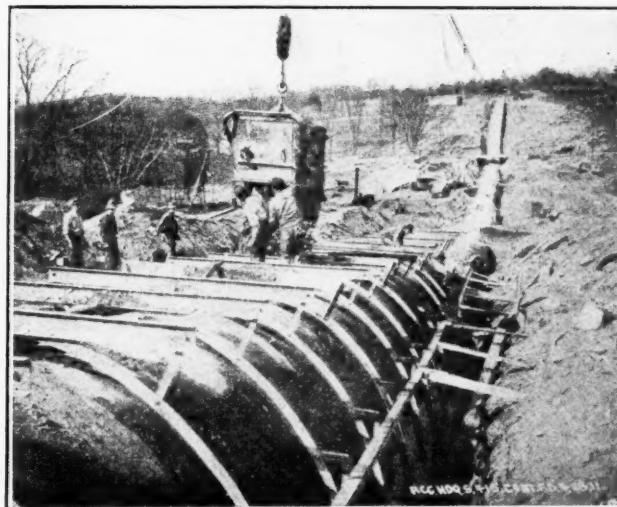
The specifications as adopted provided that the pipe should be tested by filling with water, should be made tight while under pressure, and while still under the normal pressure should be surrounded with concrete, the pipe being kept under hydrostatic pressure until the concrete last placed had set for at least 48 hours. The water was then to be withdrawn from

the pipe and the interior lined. It was provided that the lining should consist of Portland cement and sand mixed in such proportions as might be ordered, but probably one part of cement to two parts of sand. The lining was required to be of substantially uniform thickness throughout the entire circumference except for the unavoidable variations due to lap of the plates, butt straps and rivet heads.

The steel was required to be free from rust immediately before the application of either outer coating or inner lining. As a partial protection against rusting during transportation and construction, each pipe, after being pickled at the works, was given a coat of heavy lime whitewash, made as follows: To one barrel of whitewash (about 50 gallons), there were added 20 pounds of glue. After using this whitewash for a time, about one pound of Portland cement was added for each gallon of whitewash. The glue was dissolved in water before being added to the whitewash. The whitewash was applied with brushes, a machine for spraying by compressed air being found unsatisfactory. The whitewash did not adhere very well, some of it being removed almost as soon as applied. This temporary coating, however, did not suffer from abrasion or cracking off so much as from exposure to the weather; and even where the whitewash was not disturbed, light rusting occurred. In fact, the pipes arrived at the trench with more or less complete coats of light yellow rust; but there were no indications of any tendency to pitting, and the rust and the whitewash which remained were removed, before applying the concrete or mortar, by the use of wire brushes, although for some of the worst places steel scrapers were also employed. Inside some of the siphons the surfaces of the plates were rubbed with empty cement bags after the wire brushing.

The methods employed for placing the concrete jacket were practically the same as those commonly used for concrete conduit construction, in which steel centers take the place of the steel pipe. On one siphon three methods were employed in different parts; monolithic; the invert first, then the remainder; invert and side walls to the horizontal diameter, then the arch. The best contact between jacket and pipe was obtained when the concrete was placed monolithically. Incidentally it was found that dropping concrete on to the pipe so as to cause shock should be avoided, a two-foot drop being too great. Earth covering was placed immediately after the completion of the concrete jacket, to protect it from accident and from temperature changes. For this reason there has been little chance to observe what tendency to crack there may be; but so far as has been observed, there have been very few cracks in the jackets of any of the siphons built so far.

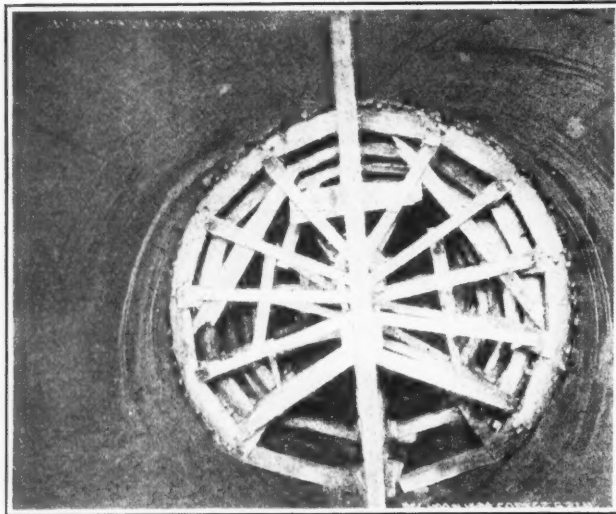
For lining the pipes two distinctly different methods were first adopted by the two contractors. On the northern half of the aqueduct, grouting with forms was employed, and on the southern half the mortar has been applied to the first siphon by



PLACING CONCRETE IN JACKET.  
Showing One Type of Forms.

the use of the cement gun. There were practical difficulties connected with the use of a complete cylindrical form, such as getting around curves, vertical or horizontal, collapsing one section of forms sufficiently to pass forward through another section which must remain in place while the grout is hardening; cleaning, lubricating and inspecting outside of form, etc. Consequently the invert for a width of about eight feet of arc has been placed first by methods similar to those of concrete sidewalk construction. These wide inverts have generally separated from the pipe along their edges, for one reason or another, so that a piece of steel tape could at places be pushed into the crack for several inches. To obviate this trouble trials have been made of inverts one foot to two feet wide.

In both contracts wooden forms in panels 2 feet wide and 15 feet long, adjusted on wooden rings and firmly braced, were used for pouring the remainder of the lining in 15-foot sections at one operation. The grout is poured from outside the pipe through a 2½-inch wrought iron pipe secured into a rivet-passing hole. In the southern department this pouring pipe is at the downhill end of the section and is long enough to give a head of about four feet at the top of the uphill end. A vent pipe is fastened in the uphill rivet-passing hole of the section, the bulkhead forming the end of the lining being placed just beyond it. The contractor for the northern siphons used, for pouring grout, two mortar boxes set on a temporary staging over the upper end of the section to be grouted. The mortar was mixed to the proper consistency in alternate boxes and allowed to flow into the pipe through a hole controlled by a sliding wooden gate. All mixing was done by hand and materials were carefully graded. It generally took about two hours to fill a section, after which a man was kept on for another hour or two in order to feed in sufficient grout to get the desired consistency. There was a noticeable tendency to get a porous or thin condition at the upper end of the section near the grouting hole. To avoid this the riser was removed two or three times during the pouring and the thin material which collected at the top was allowed to escape; when the riser was put back and grout added as necessary. In some

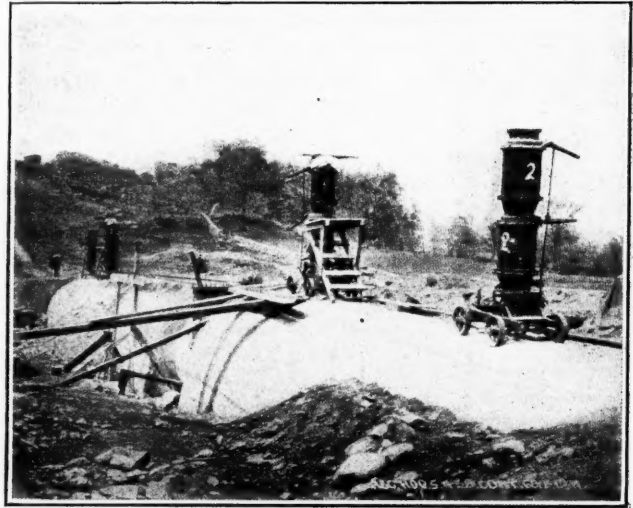


WOODEN FORM FOR MORTAR LINING.  
Completed Lining in Foreground.

cases it took nearly two hours after the main operation to get grout of proper consistency at the foot of the riser. At the finish of the pouring a small pipe was inserted through the large pipe, to permit the escape of the last air while grout was being poured through the larger pipe, and was churned into the small remaining space to insure complete filling. For the first batches, or nearly up to the horizontal diameter of the pipe, the grout was mixed one part cement to one part sand; the upper part was mixed about one to two. The rate of pouring the lining depended upon the number of forms and men available. In lining the Foundry Brook siphon about two moves

per week were made with each of twelve sets of 15-foot forms, the rate being about 400 feet per week.

The cement gun builds up the lining in layers, but these are applied in such rapid succession and each layer has such a rough surface that there is little or no lamination. It was impossible, however, to secure a satisfactory smooth finish in this way, and a final layer was applied and floated and troweled



CEMENT GUNS RESTING ON CONCRETE JACKET.

Steel Manhole With Concrete Not Yet Placed Around It.

before it hardened. In using this gun charges of dry sand and cement are placed in the chamber of the machine and then rapidly discharged by air under 50 to 60 pounds pressure through a rubber hose; water under pressure being brought by a parallel hose and combining with the cement and sand in a special nozzle. The nozzle pressure is about 30 pounds and the resulting velocity causes an excellent union between the layers; but it also results that a measurable proportion of the sand bounds off the surface of the pipe and falls to the invert, especially when beginning the first layer on the bare steel. This dry material, which averages one part cement to 3¾ parts sand, is collected and used in making the invert. The use of the gun causes the atmosphere within the pipe to be very dusty, and artificial ventilation is consequently necessary. The grout applied by the gun is considerably less moist than that poured within the forms, and consequently more attention is required to keep the lining moist in order to minimize shrinkage cracks, a considerable number of fine cracks having formed in the lining first placed in this way. In spite of these difficulties a satisfactory lining has been secured; but the contractor discontinued its use after completing one siphon, the reason given being excessive cost.

Absolute adhesion of concrete or mortar to the steel has not been secured at all points, as has been proved by careful sounding with a hammer; but on cutting out hollow-sounding spots, the space between the mortar or concrete and the steel has usually been found almost infinitesimal in width. What effect this would have on the protective action of the lining was investigated by the Board's laboratory. One of these tests consisted in placing horizontally in a galvanized iron tank six steel plates 8 x 16 inches, separated from the bottom by two 1¼-inch bars of alberene stone and from each other by ½-inch wood dowels. The first pair of plates had no protective covering; the second pair had their upper surfaces protected by a slab of cement mortar 2½ inches thick, held from contact with the steel by two metal strips about .04 inch thick; the third pair of plates was protected by cement mortar slabs 2 inches thick, cast directly on the steel, and apparently adhering to it firmly. The tank was filled with Croton water to four inches above the uppermost mortar slab, the water being renewed twice monthly and the slabs being immersed for two years. Each slab had been cleaned by pickling and rubbing with emery cloth before treatment. At the end of the two years the



first plates showed heavy corrosion. The second pair of plates showed a very slight corrosion, most of which washed off, thus indicating a considerable protective influence under the conditions described. When the mortar was removed from the third pair of plates it was found that a part of the surface of the steel had a distinctly different appearance from the other part. One part was clean and wet; the other was covered by strongly adhering particles of mortar and was dry, thus indicating that there had been actual adhesion of the mortar over the latter part of the surface only, and that the former had been separated by a space large enough for the water to enter. There had, however, been no rusting except at some places near the edges of the wet part of the surface, where apparently the space had been sufficient to allow circulation of the water. The water in the rest of the space had evidently been so highly charged with lime that no corrosion could take place.

Another experiment was made by immersing  $\frac{3}{4}$ -inch round soft steel rods in slabs made of rather lean concrete which, after about two years, were broken and found to be thoroughly saturated, but the rods showed no sign of corrosion whatever. It is hoped that the pipes will last one hundred years and even longer, because of the cement lining. In addition, because of the gain in smoothness of the interior surface obtained by covering the rivet heads and plate laps, it is computed that the hydraulic capacity of the three pipes would be as great as that of four unlined ones.

The contract prices of the several siphons, all of which were let in two contracts, were as follows:

CONTRACT PRICES FOR STEEL PIPES, CONCRETE JACKET AND MORTAR LINING.

Contract 62.

Description.	Contract price.	Average of all bids. (5 bidders.)
9 ft. 6 in. steel pipe, $\frac{7}{8}$ -in. plate, lap-jointed .....	\$31.00 lin. ft.	\$35.50 lin. ft.
9 ft. 6 in. steel pipe, $\frac{1}{2}$ -in. plate, lap-jointed .....	35.00 " "	41.20 " "
9 ft. 6 in. steel pipe, $\frac{1}{2}$ -in. plate, longitudinal seams butt-jointed .....	40.00 " "	44.80 " "
9 ft. 6 in. steel pipe, $\frac{3}{8}$ -in. plate, longitudinal seams butt-jointed .....	43.00 " "	48.80 " "
9 ft. 6 in. steel pipe, $\frac{11}{16}$ -in. plate, longitudinal seams butt-jointed .....	47.00 " "	55.80 " "
9 ft. 6 in. steel pipe, $\frac{3}{4}$ -in. plate, longitudinal seams butt-jointed .....	50.00 " "	50.60 " "
Mortar lining for steel pipes .....	2.50 " "	4.90 " "
Reinforcement of mortar lining for steel pipes .....	.02 sq. ft.	.03 sq. ft.
Concrete masonry around steel pipes .....	6.00 cu. yd.	5.85 cu. yd.
Portland cement .....	1.75 bbl.	1.74 bbl.

Contract 68.

Description.	Contract price.	Average of all bids. (8 bidders.)
9 ft. 9 in. steel pipe, $\frac{7}{8}$ -in. plate, lap-jointed .....	\$29.00 lin. ft.	\$33.25 lin. ft.
11 ft. 3 in. steel pipe, $\frac{7}{8}$ -in. plate, lap-jointed .....	33.00 " "	37.37½ " "
11 ft. 3 in. steel pipe, $\frac{1}{2}$ -in. plate, lap-jointed .....	38.00 " "	42.75 " "
11 ft. 3 in. steel pipe, $\frac{1}{2}$ -in. plate, longitudinal seams butt-jointed .....	46.00 " "	48.75 " "
11 ft. 3 in. steel pipe, $\frac{3}{8}$ -in. plate, longitudinal seams butt-jointed .....	50.00 " "	53.62½ " "
Mortar lining for 9 ft. 9 in. steel pipe .....	3.00 " "	3.56¼ " "
Mortar lining for 11 ft. 3 in. steel pipe .....	3.50 " "	4.04½ " "
Reinforcement of mortar lining for steel pipe .....	.02 sq. ft.	.02¼ sq. ft.
Concrete masonry around steel pipe .....	5.25 cu. yd.	5.78 cu. yd.
Portland cement .....	1.60 bbl.	1.72½ bbl.

In immediate charge of the construction of the siphons are Division Engineers John P. Hogan, Alexander Thomson, Jr., and George P. Wood on the northern; and George G. Honness, Ernest W. Clarke and Charles E. Wells on the southern department. J. Waldo Smith is the chief engineer of the Catskill water works, Merritt H. Smith is deputy chief. Many of the investigations of existing pipe lines were made by the assistant to the chief, Department Engineer Thaddeus Merriman.

In discussing the matter of preparation of the steel, F. N.

Speller, metallurgical engineer for a Pittsburgh firm, highly approved of the careful removal of the mill scale. He stated that experiments in which two parts of the same plate, one with and the other without the scale removed, had been exposed to corrosion showed about the same loss of weight per unit area in both cases, but this corrosion was in the form of deep pitting in the uncleaned surface, but uniformly distributed and with little damage in the other. A 5 per cent. solution of sulphuric acid, heated to about 180° Fahr. when used, he thought the most effective conditions for removing scale by pickling.

## LAYING HOUSE CONNECTIONS BEFORE PAVING

It is becoming quite common for cities to lay house connections from sewers and water mains to the curb line during the construction of the former, in order to avoid the necessity of cutting into the pavement at intervals during several years to come in order to make these connections. In sewerage a new addition in Richmond, Va., sewer and water connections were laid at intervals of 30 feet on each side; the sewer connections being carried to the property line, thus avoiding the digging up of the sidewalk as well as the roadway. The water connections were carried to the curb only, and were there provided with a curb-cock. Lead pipe was used for the water connections, and thus there was largely, if not entirely, avoided the danger of the rusting out of unused connections and the consequent loss of water. The cost of the two connections averaged about \$16 for each pair. The property owner is charged for these connections whenever he makes use of them, the city losing the interest on the money meantime. It is considered by City Engineer Bolling, however, that the city saves money by this practice, not only in avoiding the cutting into and patching of the pavement, but also because the cost of placing the connections would be greater after the pavement has been laid.

In Baltimore, where hundreds of miles of sewers are being built, and a considerable percentage had been completed before a single house was connected with them, house connections have been carried to the curb in the business streets, where it was desired to immediately construct improved pavements. Most of the pavements in the city, however, are still cobble stone and it is the intention, so far as possible, to have all houses on such streets connected with the sewer before improved pavement is laid. In order to induce the public service corporations which have structures under the street to do all the work which they can foresee prior to improved paving, City Engineer McKay has established a rule that repaving over all cuts in improved pavements shall be done by the city, and that the department will charge \$6 per square yard for such repaving. The gas company's mains are generally about 4 feet from the curb, and it is required that this company tunnel this 4 feet to the main in making connections, place and leave timber in the tunnel, and puddle back-filling into the same; and also guarantee the improved pavement above it indefinitely. This rule has been in operation only a few weeks, but has resulted in the number of cuts in improved pavement being reduced to about one-fourth of the number made during the corresponding period last year.

## HOUSE NUMBERS ON CURB.

An experiment which was tried out thoroughly by the city of Pasadena, Cal., and has been pronounced a success, is that of placing the house numbers at the curb in front of each residence, conspicuous black numerals being placed on a white rectangle. The names of the streets also are painted on the curb at street intersections. The convenience to delivery men, visitors and strangers in the city is obvious. Anyone who has tried to find a house number at night, ringing door bells along the street in the attempt, will appreciate the convenience. To the merchant it is a saving of dollars to economize his delivery men's time, especially in the holiday season.

## REPAIRING ASPHALT PAVEMENTS

In a report dated October, 1911, the Chicago Bureau of Public Efficiency calls attention to a number of undesirable conditions and practices connected with repairing asphalt pavements by contract in the city of Chicago. A number of the criticisms will apply to methods employed in other cities as well, but which should, it would seem, be remedied as quickly and conclusively as possible.

One of these is the method of payment for such repairs. The Chicago practice is to pay the contractor a fixed price of \$7 per cubic yard for concrete in foundations and \$5 per ton for binder; but to pay for the surfacing material by the square yard at a price bid by the contractor. The repairs are supposed to consist of 1½ inches of surface material, and 1½ inches of binder if the depth of the patch will permit it. The reason for paying for the binder by the ton or volume rather than by the square yard is undoubtedly because of this variation in its thickness, and would seem to be a valid one. The temptation, however, is for the contractor to use an excess of the material for which he is paid by the ton, and thus lay an insufficient thickness of the material for which he is paid by the square yard. This temptation is believed by the Bureau to be heightened by the payment of an unnecessarily high price per ton for the binder—\$5, especially in view of the fact that the contractor is permitted to use, in the preparation of the binder, old paving material removed from the street. As a matter of fact the Bureau claims to have found that, of 370 measurements made on the west side of the city, twelve showed the thickness of the top surface to be more than 1½ inches, 27 just 1½ inches, and 331 less than 1½ inches and averaging 1 1-64 inches. One hundred and sixty-seven were not more than one inch in thickness.

In order to avoid this slighting of the wearing surface, it is recommended that this be paid for by the ton or cubic foot, as is the binder. Also that the wearing surface be under no condition less than 1½ inches thick; and where the total thickness of both wearing surface and binder is less than 2½ inches, that the binder be omitted and the repair be made with surface mixture only. It is also recommended that bids be received for the binder as well as for the surface mixture; as the method of bidding now employed in Chicago produces the same results as an unbalanced bid by a contractor, and offers the same temptations and opportunities for defrauding the city.

Another defect in either the specifications or the practice has to do with the removal of the old pavement. In removing defective pavement it is the custom to raise it from the foundation with a pick or bar and break it off with a cutter. This method causes the pavement to be lifted beyond the line where it is cut, and thus destroys the bond between the binder and the concrete base of a portion of the pavement left in. Inspection in Chicago showed instances where this extended 18 inches under the retained pavement. The proper way would be to cut nearly, if not completely, through the top and binder before prying up the pavement at all.

Attention has frequently been called by engineers and paving experts to the objectionable features of dumping asphalt in place, raking only the top of this pile onto the foundation and leaving the bottom where it was first deposited. The latter material is then more compacted than the other, and no amount of raking and rolling will prevent this from causing an unevenness in the pavement. The material, after being dumped, should all be turned and distributed to place, so that all may be deposited and raked under similar conditions.

A practice which, while it may not be objectionable from the point of view of the excellence of the repair, results in an enormous loss to the city, is that of cutting out larger patches than are marked by the inspector for removal, the contractor being paid for the size of the patch actually made. The remedy for this would apparently be to have the inspectors insist upon the cutting out of the old pavement exactly along the inspector's lines.

Another faulty practice in violation of the specifications was found to be the use of binder which was not sufficiently hot, and the failure to roll the binder before the application of the surface coat. Each of these results in a later compression of the binder and in consequent formation of hollows in the surface of the pavement.

## OIL IN CEMENT MORTAR

### Experiments and Tests by Office of Public Roads—Waterproofing Results Apparently Perfect—Strength Slightly Less

In October, 1909, Logan Walter Page, Director of the Office of Public Roads of the U. S. Department of Agriculture, found that oil in considerable quantities could be combined with wet Portland cement paste by simply mixing. This suggested to him that there might be some value in such a combination, and he at once began experiments to determine the effect of such a mixture upon the various properties of mortar and concrete. Mr. Page described the tests and the information obtained from them in a paper presented before the American Society of Civil Engineers on November 1 of this year.

Experimental pavements built of concrete containing oil were laid on two bridges at Ridgewood, N. J., in April and May, 1910; upon 400 feet of street surface in May and June of the same year; upon 300 feet of street surface in Washington, D. C., in the latter month and upon a half mile of road laid in the suburbs of Harrisburg in the summer of 1910 (see MUNICIPAL JOURNAL for September 6, 1911), and Mr. Page reports that each of these test pavements was in very good condition at the time of writing the paper. It is not evident, however, just what the advantage of the oil is in concrete pavements.

In adding the oil, the cement and sand were mixed and wet up after the ordinary method of preparing mortar by hand, after which the desired quantity of oil was added and the mortar turned over and over until the oil was thoroughly incorporated with the mortar. After this moistened stone was added and mixed as in ordinary hand mixing of concrete.

As a method of waterproofing concrete, his experiments would indicate that the addition of oil is very successful. A vault 112 feet long and 18 feet wide was built for the U. S. treasury department with concrete in the side walls, containing oil to the amount of ten per cent. of the cement, and a 3-inch covering of the same on top; and although this was subject to a head of 7 feet of water for several months, it showed no signs of leakage. Another treasury vault which had always leaked so as to be useless was made perfectly dry by treatment with oil concrete. Vessels 2½ inches high and 8 inches outside diameter with walls one-half inch thick, made of 1:3 oil cement mortar, when immersed in water remained absolutely dry on the inside at the end of six months; while similar vessels made without the oil became damp inside in one minute and in a few days completely filled with water.



ABSORPTION TEST OF OIL CONCRETE.

For municipal engineers, this subject would appear to be especially interesting in connection with reservoir linings, flush tanks for sewerage systems and similar structures which are intended to be water-tight. Also for pump pits carried below ground water level and similarly submerged structures. An additional demonstration of the impermeability of the oil ce-



ment mortar was obtained by placing a specimen 3 inches thick and 6 inches in diameter under a water pressure of 40 pounds per square inch; the specimen remaining perfectly dry for 24 hours, whereas the similar test specimen without the oil leaked 146 cubic centimeters under the same conditions. A one-half inch coat of 1:3 mortar containing 10 per cent. of oil, applied to the surface of a very porous concrete, was absolutely effective in preventing leakage, even under comparatively high pressure.

Nothing is said as to whether water stored in a reservoir composed of such concrete would be rendered unpleasant for public use by the giving up of a portion of the oil by the concrete; but it does not seem probable that there would be any such effect if the concrete were thoroughly washed off before the reservoir was filled.

The effect upon the physical properties of cement and mortar by the addition of the oil has been under examination by Mr. Page for two years, and a number of test pieces are still being kept for the purpose of making various tests upon them at still greater ages. These tests seem to indicate, among other things, that there is no advantage in adding to concrete more than 10 per cent. of oil of the kind used (the amount of oil is expressed in percentage of the amount of cement used). With a different kind of oil or different grade of aggregate somewhat different results might be obtained. The sand used was a river sand with 30 per cent. voids, and the coarse aggregate was  $\frac{3}{4}$ -inch crusher-run gneiss. Three different oils were used. Each of these was a fluid residual oil of a greasy character with a specific gravity at 25 degrees centigrade of 0.910 to 0.926, a loss at 163 degrees in five hours of 6.86, 12.56 and 7.98 per cent. respectively; the residue being fluid and greasy in character. The amount soluble in  $C S_2$  at air temperature was 99.99 per cent. in two cases and 99.93 in the third. There was no inorganic insoluble matter in any of the oils. The fixed carbon amounted to 2.41, 3.36 and 5.11 respectively, and the specific viscosity, Engler 50 degrees centigrade, was 14.2, 6.4 and 18.2, respectively. The percentage of total bitumen insoluble in 86 degrees paraffine naphtha was 2.23, 6.82 and 10.16 per cent. respectively. There seemed to be no difference between the action of these oils in affecting the physical characteristics of the concrete, with one exception: the crushing strength was seriously decreased with the addition of oil up to 10 per cent. in only one case, that of the first-named oil. The only marked difference between this oil and both of the other two, so far as the characteristics named above are concerned, was the last-named characteristic, indicating possibly that the crushing weakness was occasioned by the smaller percentage of bitumen insoluble in naphtha.

Without describing at length the experiments made, we present the conclusions drawn from these by Mr. Page, as contained in his paper. These conclusions were as follows:

1. The tensile strength of 1:3 oil-mixed mortar differs very little from that of plain mortar, and shows a substantial gain in strength at 28 days and 6 months over that at 7 days.
2. The times of initial and final set are delayed by the addition of oil, 10 per cent. of oil increasing the time of initial set by 90 per cent., and the time of final set by 60 per cent.
3. The crushing strength of mortar and concrete is decreased by the addition of oil to the mix. concrete with 10 per cent. of oil having roughly 75 per cent. of the strength of plain concrete at 28 days. At the age of one year the crushing strength of 1:3 mortar suffers but little with the addition of oil in quantities up to 10 per cent.
4. The toughness or resistance to impact is affected but slightly by the addition of oil in quantities up to about 10 per cent.
5. The stiffness of oil-mixed concrete appears to differ but little from that of plain concrete.
6. The results of tests for permanent deformation do not indicate that a law is followed by oil-mixed concrete.
7. Oil-mixed mortar and concrete containing 10 per cent. of oil have very little absorption and, under low pressures, both are waterproof.
8. Oil-mixed mortar containing 10 per cent. of oil is absolutely watertight under pressures as high as 40 pounds per square inch. Tests indicate that oil-mixed mortar is effective as a waterproofing agent when plastered or painted on either side of porous concrete.

9. Bond tests show the inadvisability of using plain bar reinforcement with oil-concrete mixtures. With deformed bars the bond is not weakened seriously by the addition of oil in quantities up to 10 per cent.

A patent has been taken out by Mr. Page for the mixing of oil with Portland cement, concrete and hydraulic cements giving an alkaline reaction, but this has been done only to prevent others from monopolizing or charging a royalty for the process, as he announces that all United States citizens are at liberty to use it without the payment of royalties.

## WOOD, CONCRETE, STEEL AND CAST IRON CONDUITS

In the report of Rudolph Hering on the selection and utilization of a new source of water supply for Charleston, S. C., an estimate is given on the cost of bringing the water to the city through about 23 miles of pipe, the pipe line to have a capacity of ten million gallons in 24 hours. A 36-inch pipe was calculated as being the size required. In deciding upon the material to be used, an estimate was made on continuous wood-stave pipe, machine-made wood-stave, reinforced concrete, lock-bar steel pipe and cast iron pipe. Reinforced concrete pipe was not estimated on for use where the head gave a pressure exceeding ten pounds per square inch, but for greater pressures it was designed to substitute either cast iron or steel pipe. Concerning these several materials Mr. Hering said: "Continuous wood-stave pipe, such as has been used in numerous places in the west and to a more limited extent in the east, if properly designed and well built and banded in the trench has been found to make a satisfactory conduit, quickly and easily constructed and low in first cost and maintenance.

"Machine-made wood-stave pipe is somewhat similar to the continuous wood-stave pipe, except that it is made in the shop, the wood-staves being banded with the steel bands by machine. The pipes are shipped in convenient lengths and are joined together in the trench. Under certain conditions the machine-made wood-stave pipe is to be preferred to the continuous wood-stave pipe."

In comparing the costs of a line built of these several materials it is estimated that trench excavation would cost 30 cents per cubic yard, and that the pipe in place in trench would cost as follows, 36 inches diameter being assumed in each case: Continuous wood-stave pipe, \$3 per foot. Machine-made wood-stave pipe, \$3.60 per foot. Reinforced concrete pipe, \$5.75 per foot. Lock-bar steel pipe, \$5.76 per foot. Cast iron pipe, \$6.30 per foot. It was apparently assumed that the co-efficient of roughness would be the same for each class of pipe, and consequently that the diameter would be the same whatever the material used.

## SANDING STREET PAVEMENTS

Owing, we believe, partly to the climate of England, the tendency of which is to keep the pavements moist, and partly to the nature of the paving materials employed, it seems to be much more necessary to sand the pavements of London and other cities in that country to render them safe for horses than is the case in this country. So common a practice is this that the authorities of the various districts in and about London have been urged to consider carefully the nature of the material employed in sanding, or as the English term it "gritting" the streets. The Roads Improvement Association states that coarse material causes considerable damage to rubber tires and is of no service in preventing slipperiness until crushed. At a conference, this association and the Institution of Municipal and County Engineers agreed unanimously in urging the desirability of every possible means being taken to insure the thorough cleansing of all streets, so as to reduce to a minimum the necessity for sanding them, and agreed that wherever the use of such material is necessary the particles should be as small as possible compatible with efficiency. The association suggests that the sand used on clean wood paving should not exceed 3/16-inch in diameter.





**Mr. Wake**—A contractor could not afford to keep these records if we go into too much detail.

**Mr. Wemlinger**—The large organization can afford to keep them, but we want to devise blank forms for the fellow that cannot afford to keep a man busy keeping track of all these details. We want something for the contractor who may have to do all this work himself.

**Mr. Watson**—The efficiency of any system of cost analysis depends, in the first place, on the accuracy of cost records. To serve the purpose well these must be clear and reliable and the conditions of the work concisely explained. Furthermore, the items of cost should be kept in accordance with some uniform system, so that records of different jobs may be compared intelligently and used advantageously in the analysis of costs for future estimates.

To get costs and to make the proper distribution on the records should be the duty of one man alone. If this man is shown what to do and how to do it, where and what changes to make, and is on the job all the time, keeping a journal and photographs as well, then at the end of a job these records are worth something; but ordinarily the time-keeper simply makes the easiest distribution he can and gives no details.

By watching the reports I myself know what job needs my attention most and when. Some contractors say: "The job is not large enough to pay the costs of a clerk." This is the biggest mistake possible, for every job will pay a clerk's wages. If you are losing money have him more than ever, for the records will show what the loss is and the reason why, and you can avoid making the same mistake again. My experience is that foremen and assistant superintendents who keep good cost records are not fit for anything else, as a rule, and could not get the work done for the estimated cost. For that reason, I say emphatically, have a cost clerk on every job; the better the man the more money you will make in the end.

In a discussion by the Indianapolis section of the report of the Committee on Uniform System of Cost Analysis considerable time was devoted to discussing the possibility of utilizing the facts obtained by such analysis in preventing the recognized evil of the low bids submitted by inexperienced contractors, which bids are too often accepted to the injury of both the contractor and the city or other party for whom the work is done.

The distinction between productive and non-productive labor and material was made a point of discussion also. In connection with this discussion DeWitt D. Moore, chairman of the committee, called attention to the committee's chart wherein it was endeavored to classify the several items of cost in a general way, this having formed a part of the report of the committee at the first meeting in 1911.

1. Material .....	{	1. Actually entering into work ÷ by items of diff. character.	{	1. Actual quantities.
		2. Accessory or incidental.	{	2. F. o. b. price.
		3. Labor.....	{	3. Waste.
2. Labor .....	{	1. Direct or productive....	{	1. Quantity.
		2. Indirect or non-productive.*	{	2. Price.
		3. Yards or shop, direct labor.	{	3. Salvage & loss.
3. General Charges.	{	1. Direct to job..	{	1. Itemized by sections of varying character.
		2. Indirect to job	{	2. Itemized by kind of work done (Gen. Div.)
			{	3. Spec. divisions, pay work.
			{	1. On job { 1. Supervision
			{	2. Repairs.
			{	3. Incidentals.
			{	2. Material delivery (A material charge)
			{	3. General supervision.
			{	1. Bond and insurance.
			{	2. Expense.
			{	3. Fittings and repairs.
			{	4. Fuel and oil.
			{	5. Specials.
			{	6. Commissary (where required).
			{	1. Petty tools.
			{	2. Tools and machinery.
			{	3. Yard and shops, payroll and expense of general character.
			{	4. General office payroll and expense.

NOTE.—Under General Charges.—To be proportioned over cost of material or labor, or their sum.

\*To be proportioned over the various items of productive labor.

Chas. C. Brown said:

As a result of the speaker's experience in keeping final records of costs of additions to existing plants, such as sewers,

waterworks, and the like, in which distinctions must be made between new construction and maintenance and repairs, he strongly urges the separation of items on the basis of productive and non-productive labor and material. The separation is made quite generally in the schedules offered in the committee report and in Mr. Luten's discussion of the same, but incidentally rather than upon a fixed principle. It may, therefore, help to point out this principle in order that it may serve as a guide to determine the method of handling the details.

The distinctions between the above two classes of labor and material are as follows:

1. What might be termed productive material and labor, to borrow the term without modifying it to fit the facts exactly, is material that remains in the work and forms a permanent part of it, and labor which puts that material in its place and keeps it there.

2. Non-productive material and labor, figuratively speaking, consist of tools, equipment, etc., used in handling the material put into the work and in holding it in place temporarily; such non-productive material being then removed permanently from the work, thenceforth to have no further connection with it. Non-productive labor is the labor which is put upon this non-productive material, in preparing it for use, in disposing of it, transporting it, etc.

3. There is also the usual class of non-productive labor, i. e., labor which has no direct effect in putting the materials into their positions in the structure.

## STREET PAVING IN BALTIMORE

### Several Hundred Miles of Cobblestone to Be Improved—To Be Used Undisturbed as a Base for Sheet Asphalt Pavement

THE city of Baltimore contains 444.5 miles of streets and 140.3 miles of alleys, "streets" including all thoroughfares more than 20 feet wide, also all under that width which are paved, curbed and provided with footways. Of these, 39.4 miles of streets and 18.3 miles of alleys are unpaved. Of those which are paved, 240.8 miles of streets and 114 miles of alleys, or a little more than two-thirds of the whole of the paved streets and alleys, are paved with cobble stone. The next largest amount of paving is ordinary macadam, which is found on 55.8 miles of streets and 0.2 miles of alleys. Belgian block comes next in order, with 42.9 miles of streets and 0.6 miles of alleys. Sheet asphalt is found on 18.1 miles of streets and none of the alleys; asphalt block and vitrified block each are found on 16.6 miles of streets and 2.6 miles of alleys. Bitulithic has been laid on ten miles of street, bituminous macadam on 2.7 miles of street and wood block on 1.5 miles of street, none of these last being found in alleys. Cement concrete has been used on two miles of alleys and none of the streets.

With 355 miles of streets and alleys covered with cobblestone, the problem of replacing this with a more modern pavement is a very serious one financially. In 1911 a few streets of cobble were improved by covering them with sheet asphalt, the cobble being left undisturbed to serve as a foundation. Several years ago a number of streets were treated in a similar way, and the asphalt pavement on these appears to be as good as that on any of the streets in the city. The altogether favorable experience with these streets and the great saving which would be effected by not having to remove the cobble stone and lay a concrete foundation in its place have convinced City Engineer H. Kent McKay of the advisability of adopting this method for improving a great deal of the cobblestone pavement in the city, and it is now proposed to spend several million dollars in such work. The specifications for asphalt and binder will be those used for ordinary work, the surface mixture being paid for by the square yard, the binder by the cubic yard. The ordinary thickness of binder is assumed at 2 inches, but this will vary from a minimum of possibly 1 inch to a maximum of several inches, owing to the irregularity of the cobble surface.

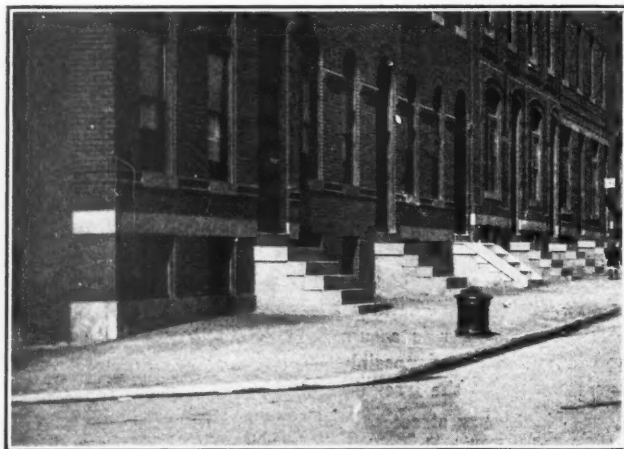
Under ordinary street construction it would be impossible to superimpose a 4-inch asphalt pavement on the existing pavement and still leave sufficient height of curb exposed at the gutters. In Baltimore, however, the cobble streets have been made with very deep gutters, these being in many cases 18 to 22



CURB AND GUTTER, COBBLE STREET.  
Asphalt surfaced pavement in foreground.

inches deep. Probably the reason for this depth is the fact that up to the present time not only the storm water from the long, steep hills, but also all the kitchen and wash water from the houses has flowed in the gutters for long distances. Probably to permit using ordinary depth of curb with these deep gutters it has been the practice to slope the pavement away from the curb for approximately a foot, bringing the deepest part of the gutter that distance from the face of the curb. This construction is shown in one of the accompanying photographs. This makes it necessary to remove the cobbles nearest to the curb.

The ordinary crown of a cobble street is considerably greater than would be desirable for asphalt pavement, and for this reason it will be necessary to fill over the cobble stones for a few feet out from the curb with concrete. Apparently as much as 6 or 8 inches of concrete will be required in places. This was done in the streets which were treated in this way last year, and a satisfactorily flat cross contour of the street was obtained with a height of exposed curb which is probably ample now that the city is thoroughly sewered. The other illustra-



ASPHALT PAVEMENT ON OLD COBBLE STREET.  
Crown flattened by raising gutter.

tion shows an old cobble street which has been treated in this way.

Repairing sheet asphalt pavements is done by contract. One hundred square yards or more in one piece is guaranteed for five years, while an area of less than one hundred square yards is guaranteed for one year. This work costs about \$1.15 a square yard by contract. Asphalt block repairs are made by the city.

The total cost of repairing the sheet asphalt and asphalt block streets during the past 30 years has been calculated for each street, and the total divided by the number of years out of guarantee. These costs are as follows:

Age, years.	Cost of maintenance, average (pr sq. yd. pr year)		Age, years.	Cost of maintenance, average (pr sq. yd. pr year)	
	Sheet asphalt.	Asphalt block.		Sheet asphalt.	Asphalt block.
2.....	\$0.0365	\$0.0019	17.....	\$0.1658	.....
3.....	.0287	.0035	18.....	.0688	.....
4.....	.0377	.0426	20.....	.....	\$0.1256
6.....	.....	.0044	22.....	.....	.0570
7.....	.0193	.....	23.....	.0767	.0315
8.....	.....	.0025	24.....	.....	.0062
9.....	.0803	.0529	25.....	.....	.1208
14.....	.....	.0218	26.....	.....	.0926
15.....	.2116	.0834	29.....	.....	.1022
16.....	.1383	.0069			

These figures are based on a comparatively small number of streets, and there is considerable variation between the costs on the various streets. For instance, of five streets 17 years out of guarantee (two years' guarantee period) the minimum average cost per square yard per year has been 7.2 cts. and the maximum 34.12 cts. Of the four streets 16 years out of guarantee the minimum cost has been 2.62 cts. and the maximum 41.06 cts.

In a short time we hope to be able to present similar figures of cost of maintaining asphalt pavements in other cities which, based on a large number of streets, show a fairly consistent law as to relation between age of street and cost of maintenance.

#### Pavement Cuts in Chicago

During 1910, 34,209 permits were issued for opening streets in Chicago. While the Department of Public Works is not responsible for the later condition of such cuts, it decided last year to investigate what this condition was, and twice examined every block of pavement within the corporate limits to find defects which could be traced to street openings, and found 3,612 of these. According to the records, nearly all of these had been permanently repaired in compliance with ordinance requirements, and those responsible for the openings were not liable for further repair; but the department nevertheless compelled the persons or corporations responsible to repair again all of these bad spots, although some of them were seven years old.

Present ordinances require that when a street is opened the material removed shall be replaced (or all of it that can be put back) and firmly tamped and the pavement restored to as good condition as before. To replace the material, which is generally clay, and restore the pavement over, it is said by Commissioner of Public Works Mullaney, to be practically impossible, and it is therefore left to settle for a time before the pavement is restored; but even then there is further settlement and the pavement foundation is broken down by the heavy traffic loads. Most of the defects found were of this character. Carelessness of the corporations undoubtedly augmented this.

Mr. Mullaney believes that the ordinances should provide that all street openings should be wider at the top than at the bottom; that backfilling should be made with sand or crushed stone (preferably the former) instead of the clay removed, in which case the permanent pavement could be relaid at once and would be less liable to after-settlement. Also, no openings should be permitted so late in the fall that the pavement cannot be restored before frost enters the ground. The records show between two and three thousand unrepaired openings when freezing weather starts, which are left until spring; another two or three thousand are made during the winter, and until good weather comes in the spring these places remain as dangerous or, at best, objectionable, humps and holes.



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DECEMBER 7, 1911.

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### Materials for Water Mains

THREE articles in this issue refer at greater or less length to the use of various materials other than cast iron for water works conduits; two of these describing somewhat different methods of constructing a conduit of steel plates protected inside and out with cement mortar and concrete. A few years ago the majority of engineers had gotten into the habit of considering cast iron as the only material adapted to water mains. A few years prior to this a number of cities, especially in New England and northern New York, had used sheet iron pipe coated inside and out with a thin shell of cement mortar; but the experience with this had in the majority of cases been far from satisfactory, and its use had been abandoned.

For conduits carrying no pressure, or a very low one, vitrified pipes were used in several cases a score of years ago. More recently some concrete pipes have been used for the same purpose. In the far west hundreds of miles of continuous wood-stave pipe have been constructed, some of it to withstand very high heads; and a comparatively small amount has been laid in the east. In the latter section of the country, however, steel pipe has been more commonly used for large conduits; the steel pipe in these cases being protected by a coating of a bituminous paint or japan.

Two of the articles in this issue describe at length what seems to be to a certain extent a reversion to the practice above referred to, that of lining the pipe with cement mortar. As stated above, this style of pipe, as manufactured 25 years ago, proved very unsatisfactory, bursting under comparatively light pressures because of rusting out of the iron which was relied upon for tensile strength. There have been several reasons for the rusting, this being due usually to imperfections in the coating or to the destruction of this through settlement of the pipe, breaking of the coating in making excavations, the exposure of the iron where house connections are made, and probably in some cases a cracking of the concrete by water hammer or by excessive expansion of the iron under high pressures. Most of these causes would be absent in the case of the large pipes constructed, but there would still be the possibility of the cracking of the cement lining by expansion of the steel under pressure or water hammer, slight deformation due to settlement of the soil, or minor imperfections in constructing the lining which would allow water to reach the steel. It is hoped and believed, however, that each of these possible dangers has been avoided by careful construction. Another advantage of these over the old cement lined pipes is the much greater thickness of the metal because of the larger size; and therefore the less relative danger caused by given depth of pitting.

### Unit Costs in Municipal Reports

Editor MUNICIPAL JOURNAL AND ENGINEER,  
239 West Thirty-ninth St., New York City:

Dear Sir—In an editorial entitled "Unit Costs in Municipal Reports" which appeared in the MUNICIPAL JOURNAL of November 8 you stated that "if the (municipal) departmental reports gave us the unit costs and comparative efficiencies, so that a citizen could know whether his dollar this year produced more or less results than last or in a neighboring city, and why, he would take more interest in these reports."

We heartily agree with you in this contention. The sole purpose of expense accounts is to furnish information regarding economy and efficiency. The degree of economy and efficiency attained can be determined only by reducing results to a basis which will make possible comparison with previous periods and the experience of other organizations engaged in similar activities; in other words, by ascertaining unit costs. A proper basis for computing unit results cannot be established, however, unless accounts are first made to show revenues accrued and expenses incurred.

Your quotation, however, from our pamphlet entitled "Short Talks on Municipal Accounting and Reporting," No. 2, namely, "the information most desired by citizens and officials with respect to current operations is how much revenue the city raises, how much it spends for running the city, and what is the excess of revenue over cost, or vice versa," is apt to be given a somewhat different meaning from what was intended, by separating it from the context of the pamphlet.

Our assertion had special reference to New Rochelle's statement of receipts and payments. We were pointing out that the information of great importance and first in order of development was what the revenue accrued and the expenses incurred have been, as the preceding paragraph in our pamphlet indicated. Moreover, in the paragraph immediately following the quotation in question we stated that "our first discussion related only to one aspect of city financing and accounting."

It is our intention to discuss the other phases of municipal accounting in future numbers of our talks.

Is not lack of interest on the part of the average citizen largely due to the fact that he has not been furnished with carefully prepared statements emanating from scientific accounting methods; in other words, the kind of statement that well conducted private corporations furnish their stockholders? The statements prepared by the large majority of cities are uninteresting and lacking in vital information—uninteresting because they are incoherent, rambling and of too great length, details being crowded into summary statements instead of being shown in supporting schedules, and lacking in information because they proceed from accounts not designed with proper regard for the kind of information that is most useful to the official and the citizen.

When cities install scientific accounting methods and prepare statements in brief form that tell their story almost at a glance, will not public interest in municipal affairs be likely to increase? There is already abundant evidence of this in many localities throughout the country.

Nothing will help more than unit costs. It is to obtain accurate unit costs for cities, and other benefits of good accounting, that the Metz Fund is spending \$10,000 a year on a campaign for constructive accounting reform.

We hope you will help us carry the message where it will do good.

Very truly yours,

U. L. LEONHAUSER,

Secretary National Fund for Promoting Efficient Municipal Accounting and Reporting.

We agree with all that Mr. Leonhauser says, and would offer every encouragement possible to the Metz Fund in obtaining "accurate unit costs for cities." But unit cost is the quotient of two sets of items—total expenditure and units of work performed; and it seems to us that so far most of the efforts of bureaus and other organizations have been concentrated on the expenditure items, while the work units have been neglected. We have had voluminous instruction concerning how to state truthfully and accurately the total amount to be charged against street cleaning, for instance, but none as to how to state the amount of cleaning done. One city gives the number of miles which have been kept clean, another the square yards of cleaning done, another the cubic yards of material removed. But the costs on the basis of these different units are not comparable, and would not be correctly so unless allowance also were made for kind of pavement cleaned, frequency of cleaning, method of cleaning, local prices for labor, teams and materials employed, etc.

Accurate financial accounting is a means to an end, which end is unit costs. And the units for measuring many kinds of municipal activities are in a chaotic and most unsatisfactory state. It seems to us that the accounting of revenues and expenses has been advanced to the point where it can be left temporarily, while our energies are concentrated on bringing the units of measure of accomplishment to a condition of equal accuracy and utility for the end in view—determining unit costs, which are the real measure of efficiency. It is of little use to obtain a high degree of accuracy in the dividend and pay no attention to the gross inaccuracy of the divisor.

#### COPYING DOCUMENTS BY CAMERA

THE copying of records by photography is being tested by Recorder of Deeds Edward C. Joyce, of Providence, R. I., who believes that the process is adapted to making certified copies of all kinds of records quickly and economically, reducing the clerical work of his department about 50 per cent and permitting copies of deeds, etc., to be sent out within 24 hours of receiving request for them.

The camera, which is one especially designed for the work of copying all sorts and kinds of documents, carries a roll of 350 feet of sensitized paper, which is inserted just like a roll of films. The lens reflects the image of the object to be photographed on this roll, and the exposure is made in the customary manner, the light being provided by two mercury vapor tubes of 750 candle-power each. Ten seconds' exposure is all that is required for the purpose of photographing the object. The operator at the conclusion of the exposure turns a crank at the back of the camera, and the exposed portion of the roll is dropped into a pan of developing solution and is at the same time cut from the rest of the roll.

A 30 seconds' immersion in the developer is sufficient to bring out the print, the developing solution fixing the image at the same time. It is then washed in the usual way. The entire operation is less than one minute.

The speed of the process enables the photographing of four pages of the official records of the department a minute. Recorder Joyce has tried the system on different colored inks, and has found that it works absolutely in reproduction, the ray screen filter bringing out the signatures in clear and distinct manner. The first photograph is a negative, with the writing on the document in white letters on dark background. The positive, if it is necessary to make one, is secured by photographing the negative, when the letters appear in black on white background.

#### PUBLIC ROADSIDE FRUIT TREES

THE auction sales of native fruit grown on the trees bordering the country roads in the township of Linden, adjoining the city of Hanover, yielded this autumn 20,612 marks (\$4,906). Along certain stretches of these roads the yield has amounted to 1,500 marks (\$357) per kilometer, or at the rate of \$595 per mile. The Province of Hanover has some 7,000 miles of country highways bordered with fruit trees, the profit of which is appropriated toward the upkeep of the roads. These roads, which are commonplace to the native resident, are the delight of the American tourist, who often wonders why roadsides in the United States are not thus planted to fruit.

This application of the beautiful, practical and economic possibilities embraced in the control of such public property as roads is a fine illustration of the community thrift of the German. During the three or four weeks' period of ripening sharp-eyed old watchmen on bicycles patrol the roads, being particularly active on Sundays, when the people are out in large numbers. It is forbidden to pick up fruit from the ground, and to knock it from the trees is subject to a fine of 100 marks (\$23.80) or more for each offense. Laws and regulations for the general good, however, excite such respect on the part of the German that cases of theft of fruit from the highway fruit trees rarely occur.

#### TRENTON WATER WORKS NOTES

It is reported that more than 100 cases of typhoid fever have appeared in Trenton, N. J., within a few days, 25 of them within two days, and considerable alarm is felt by physicians. While no systematic investigation has yet been made, indications seem to point to the water supply as the cause. The city was warned by the State Board of Health several months ago and directed to take immediate measures toward preventing typhoid, but deferred any practical steps until quite recently. A few days ago a hypochlorite plant was put into operation at the pumping station, where the water supply is drawn from the Delaware River, but apparently the installation of this was delayed just a little too long to prevent the epidemic.

A daily paper of Trenton, N. J., publishes under the heading "True Value of Water Department" an inventory of the equipment at the pumping stations of the city water works, which it states has been prepared by a member of the new Commission. This gives some figures in great detail, under the headings, Year Bought, Condition, Cost and Present Value; the items including not only pumps, intakes, wells, machinery, etc., but also such minor items as chairs, wrenches and pipe cutters. The majority of these are reported to be in good condition, although a considerable percentage are reported as being in fair condition only. On first sight, it would appear that this should be a valuable table, giving the citizens an idea of the value of their plant as an asset. It requires only a minute's inspection, however, to show that this is by no means the case. The columns headed "Cost" and "Present Value" would indicate that allowance had been made for depreciation of machinery and appliances. An inspection of the figures, however, shows only two items on which any depreciation whatever had been charged off; one of these being a depreciation of \$15.85 on carpet and rugs purchased in 1910 and the other \$46 on a hot well pump. A 10-million gallon pumping engine purchased in 1893 is given a present value not one dollar less than its cost eighteen years ago. The same is true of another 15-million gallon pumping engine purchased in 1903, boilers purchased in 1899, iron pipe purchased 27 years ago, an engine and electric generator purchased 15 years ago, gas engines and pumps and a standpipe purchased 3 years ago, and numerous other items. The giving of the name "Present Value" to machinery 15 and 18 years old is an absurdity which should deceive no one.



## NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Fire and Police Items—Government and Finance

## ROADS AND PAVEMENTS

## Good Roads Talk to Supervisors

Racine, Wis.—A. R. Hirst, representing the State Highway Commission, addressed the county board at Racine last week on the provisions of the law under which the State is conducting its State aid for highways campaign. He said that Racine County has not taken advantage of the provisions of the law probably because the people do not understand it, but he urged that something be done at the present session of the board. Mr. Hirst made plain the fact that this county will be assessed for the State highway work whether it participates or not, and because of that fact it should take the necessary steps to get back from the State the money it is entitled to. Mr. Hirst earnestly recommended that only first-class road work be done and expressed the belief that it would be better to build no roads at all than to lay them in a careless manner. He said the cost of maintaining poorly built roads is more than the original cost of good ones.

## Pave Streets With Gold

Pasadena, Cal.—California street, next to Fair Oaks avenue, the longest street in Pasadena, is being paved with gold. At least gold-bearing rock is being used as the foundation upon which bitulithic will later be laid. Two veteran prospectors, James Hornaday and James Capton, both of this city, are authority for the declaration that the crushed stone being used in the paving work is gold laden. Of a dozen pieces of rock picked up in the street more than half bore evidences of gold ore in paying quantities. Andrew Holloway, who holds the paving contract for California street, says the rock comes from the San Dimas quarries, which have supplied thousands of tons of it for street and road improvement work in various parts of southern California.

## Work of City Asphalt Plant

San Francisco, Cal.—The report of the municipal asphalt plant for July, August and September has been transmitted by the Board of Public Works to the Supervisors. In July the material laid amounted to 164,485 square feet, and the cost was: For material, \$10,856.53; for labor and teaming, \$7,357.55; the average cost being 11.07 cents per square foot. The figures for August were: Material laid, 177,695 square feet; cost of material, \$11,033.75; labor and teaming, \$8,433.40; cost per square foot, 10.94 cents. For September: Material laid, 175,117 square feet; cost of material, \$10,603.83; labor and teaming, \$7,655.80; cost per square foot, 10.43 cents.

## World's Longest Concrete Bridge Dedicated

Spokane, Wash.—The recent dedication of the Monroe street bridge, said to be the largest concrete arch structure in the world, was an event of national engineering importance. The Rocky River bridge at Cleveland, with a span of 280 feet, has held the record until the completion of the Spokane structure. The Monroe street bridge has a span of 281 feet and cost \$500,000. The structure is 791 feet in length with a 50-foot roadway. It carries a double-track electric car line and a highway and has two 9-foot cantilevered sidewalks. It consists of a middle-segmental span of 281 feet, two 120-foot semi-circular spars, a 100-foot semi-circular span, a retaining wall 93 feet in length with a maximum height of 53 feet. The main arches are not reinforced, but others are either of concrete reinforced with rods and wire mesh or of structural steel encased in concrete. Every dollar's worth of work was done by day labor, the city paying \$3 for a day of eight hours to ordinary laborers, and the regular scale to skilled workers. The city bought all the material used on the structure in the open market, and thus saved a large item of the usual expense of municipal work by contract. Engineers from all parts of America and Europe joined in the dedicatory exercises.

## Concrete Steps Are Useful and Ornamental

Steelton, Pa.—The Locust street steps, one of Steelton's biggest public improvements and an achievement of its Municipal League, are now nearly completed and will be opened to public travel within the next week. This large



Courtesy of the Harrisburg Patriot.  
NEW CONCRETE STEPS AT STEELTON.

concrete structure, which is the biggest of its kind in this section, has been built under the direction of the Municipal League and the borough highway department. The steps are of a reinforced construction throughout and are finished in fine style with scarcely a rough spot any place over the surface of the concrete. The work was designed by Architect Leavitt, of New York City, whose services were secured through the efforts of Vice-President J. V. W. Reynders, of the Pennsylvania Steel Company. The steps have replaced an old wooden stairway which had been used for many years by residents of the hill above and which presented an unsightly appearance. The new step makes the residential section on the hill more easily accessible by giving a more gradual ascent with a number of convenient resting places.

## Attorney-General Gives Opinion on Road Bonds

Madison, Wis.—Attorney-General Bancroft has ruled in answer to an inquiry from the State Highway Commission that a town may issue bonds for an unlimited amount of highway improvement, the bonds therefor to be payable during a series of years, and may make the entire improvement in a single year.

## Paving Notes From Newark

Newark, N. J.—The laying of the bitulithic surface of the south side of Market street, from the Pennsylvania Depot to Broad street, is now completed. Workmen are removing the old paving block from the north side of the thoroughfare to make ready for the concrete base there. During the winter, on "open" days, when the cold is not too severe, the work will progress.

Work on the temporary paving of the north side of the Plank road leading to Jersey City with telford is about completed and the driveway will probably be thrown open to vehicles at once. The temporary road was decided upon to help settle the foundation for the wood block that is to be laid eventually. Uncertainty as to the stability of the road-bed prompted County Engineer Owen to advise against the laying of the final pavement until the road had been properly settled. It is intended that the temporary pavement be allowed to remain for at least a year.

### Railroad Constructs Bridges Over Grade Crossings

Bristol, Pa.—The Pennsylvania Road has been improving its road at a cost of approximately \$1,012,000. Seven new bridges have been erected over streets, thus eliminating



Courtesy Newark News.

BRISTOL GRADE CROSSING ELIMINATED.

grade crossings. Four of the bridges are of solid reinforced concrete floor construction, supported by steel, and three are of reinforced concrete slabs. The accompanying illustration shows the general style of architecture.

### To Increase State Authority Over Highways

Trenton, N. J.—As the result of a conference arranged by Edwin A. Stevens, State Commissioner of Public Roads, with the county engineers and supervisors, a committee of three engineers and three supervisors has been appointed to work in conjunction with the State commissioner to draft acts which will increase the authority of the State over certain roads. It is proposed that the highway department assume charge of the construction and maintenance of highways connecting county seats, as well as some other roads of special importance, such as those connecting bridges and ferries. It is likely that the State will take charge of certain experimental road construction. It was also suggested at the meeting that the law should provide for the paving of the entire width of any county road, from curb to curb, the county being empowered to assess upon the adjoining lands the cost of that portion of the work which will lie between the central sixteen feet and the curbs; this action to be taken only in cases where the property owners petition for such pavement, as they now do in the cities.

## SEWERAGE AND SANITATION

### City Health Board Doooms Drinking Cup

Atlanta, Ga.—The Board of Health has adopted the following rules:

1. That the board of health shall only placard houses for scarlet fever and diphtheria.
2. That all placards shall be reduced in size to a card 4 by 6 inches.
3. That physicians will only be required to report cases of smallpox, scarlet fever, diphtheria and typhoid fever.
4. That diphtheria placards will be put up on bacteriological examination as heretofore or on clinical diagnosis, but that quarantine of diphtheria cases will be raised, the premises fumigated, and placards taken down either on a negative culture or by the physician in charge reporting to the health department that all clinical signs of the disease have disappeared, the health department keeping up the quarantine for 12 days after such report from the physician in charge.
5. That a rigid enforcement of the foregoing be instituted by the health officer and that cases be made for any and all violations of same.

### Pensacola Accepts Sanitary Sewers

Pensacola, Fla.—The city of Pensacola and the sewer contractors have entered into a supplemental contract whereby the former accepts the sanitary sewers without accepting from the contractors the storm water sewers, which are in course of construction, but which are not nearly completed. By this contract, which was drawn by the Board of Bond Trustees, the city takes possession of the sanitary sewers without awaiting the completion of the storm drains and thereby can force property owners to make sewer connections and not delay the paving contractors in their work. The sanitary sewerage work has just been completed in all sections of the city, being part of a contract recently awarded to complete the sewerage system of the city. The paving contractors have agreed in their contract to complete the work within 200 days, and in order not to delay them the bond trustees secured the supplemental contract and will have all connections to houses made prior to the work commencing.

### Board of Health Orders Cows Tested

Portsmouth, Va.—At a recent meeting of the Board of Health the secretary was directed to inform dairymen supplying milk in Portsmouth of a city ordinance requiring cows to be inoculated with tuberculin. The board also passed a resolution requiring all dairymen to furnish to the milk inspector by Feb. 1, 1912, certificates showing that cows had been tested. In the letter informing milk men that they must have cows tested for tuberculosis the secretary will explain that owners of cows may have the testing done free by applying to the State Board of Agriculture. The State law requires that tests be made when requests are received from owners of herds. It protects the dairymen, but was not designed to protect the consumer. Under the city ordinance the Board of Health can make examination compulsory. When cows are tested by the State those showing symptoms of disease are paid for out of State funds. Heretofore milk coming into Portsmouth has not been under strict surveillance, but after February 1 of next year all milk will be barred, unless the owner of the cow supplying milk can show a certificate of inoculation.

### Pure Milk and Meat Ordinance Drafted

Fort Worth, Tex.—The draft of the proposed milk and meat ordinance has been prepared by Dr. Bittick, the pure food inspector, and it will be acted on by the City Commission at an early date. The ordinance aims to insure strict sanitary condition of all meat and milk offered for sale to the public and will be rigidly enforced, it is said, after its adoption. While the ordinance will provide for wholesome and sanitary meat, it will deal principally with the handling and sale of milk and the cleanliness of dairies. It also provides for the rigid inspection of milch cows for tuberculosis and for the rejection of such as are found to be infected.

### "Don't Spit on Sidewalk" Signs for Business Streets

Norfolk, Va.—Health Commissioner Powkhatan Schenck will erect 100 signs on the principal downtown streets as a reminder to the citizens not to expectorate promiscuously. Two or three times since he became health commissioner in September, 1910, Dr. Schenck has tried the effect of making examples of the wanton spitter and has had fines imposed in the police court. He sent sanitary inspectors out for the particular purpose of bringing in some of the many who flagrantly and constantly violate the ordinance. But he recognized the impracticability of keeping his inspectors permanently on the watch for such offenders and, realizing the necessity to be more emphatic than simply to appeal through the newspapers and health bulletins, he prevailed upon the police authorities for an order directing the arrest of sidewalk spitters. Yet, the ordinance is practically a dead letter. And the spitting element continues, embracing the immunity it has of old enjoyed through the tolerance of the police and also through the inevitable difficulty of enforcing the ordinance.

### Club Members Plan to Improve Sanitary Conditions

Washington, D. C.—Renewed effort is to be made by the members of the Monday Evening Club to bring to the attention of the District health authorities instances of insanitary conditions in streets, alleys and houses. Blank cards for the furnishing of such information were distributed among the members at the last meeting of the club held in the Young Men's Christian Association Building. The cards, when properly filled out, are to be returned to the housing committee of the club, or the Associated Charities, for the purpose of being turned over to the health authorities. In his address on "A Volunteer Inspection of Houses," Mr. Weber urged that a clearing house be established for all kinds of complaints arising from insanitary conditions. The filling out of the cards, he said, would not entail a great amount of investigation, but the necessary information could be obtained almost through casual inspection by any one interested in bringing about an amelioration of insanitary conditions. The speaker pointed out that the health department could not employ a sufficiently large force of inspectors to keep thoroughly posted on conditions in every section, but that if it were given the co-operation of citizens it would be able to accomplish much more than could be expected of it under present conditions.



### Work on New Reservoir Is Abandoned for Winter

Binghamton, N. Y.—Binghamton's new reservoir is boarded up and work will not be recommenced until April. It was hoped that the work would progress far enough to allow the completion of one-half of the reservoir this fall, but bad weather and delay in material made this impossible. The concrete work was in progress when the cold weather called a halt. The forms are placed and reinforced rods ready for the mixture and the material is safely housed for use next year. The reservoir will be completed by the middle of the summer and will be in use within a year.

### New City Well at Georgetown

Georgetown, Tex.—The new well of the city's water plant came in with a stream flowing 400 gallons a minute. The well is 120 feet deep and is 8 x 12. The water strata between the north and south Gabriel were dynamited. The pumps record the amount of water. The water is of the clearest, purest type and suitable for drinking and domestic purposes. The old pumping station on the San Gabriel River will be abandoned. The present water and light plant is of the very best type. The improvements cost about \$50,000.

### Intake Tower at Lake Altoona Is Being Extended

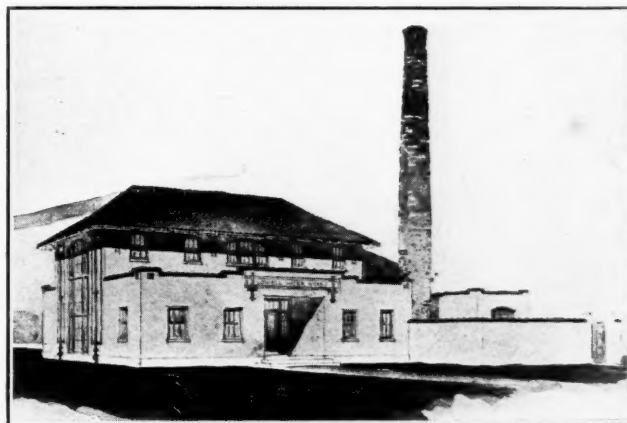
Altoona, Pa.—The contractors at Lake Altoona are at present engaged on the work of building an addition to the intake tower, which is located at the embankment and must be built higher as the work on the embankment proceeds. For the present they will build it about 10 feet higher, which is as high as will be necessary under the present contract. In the center of this tower there is a 60-inch cast iron pipe, which is imbedded in concrete. Provision is made in connection with the intake tower for an overflow through this large pipe, while surrounding the pipe on the sides provision is made for the regulation of the intake at the various sluices. The entire machinery of the reservoir can thus be regulated from this tower, and in case it is necessary to draw off the water or a portion of it, it can easily be done at the intake tower. It will be very convenient in case of a freshet, or danger from a flood.

### Corporations Want City Plants Under Commission

San Francisco, Cal.—Representatives of all the leading gas and power companies of the State have appeared before the legislative committee on the proposed Railroad Commission Bill for the purpose of offering objections to certain clauses and to urge the adoption of amendments more favorable to their respective corporations. H. H. Trowbridge, the counsel for the Southern California Edison Company of Los Angeles, objected to the clause in the proposed bill which prohibited the Commission from applying the provisions of the act to any public utility owned and operated by any city, town or county. In his argument he was assisted by Warren Gregory of this city, who urged that the exclusion of municipal plants from the provisions of the act was unjust discrimination and unconstitutional. Attorney Max Thelan, who drafted the bill, declared that the State Constitution provides that the Commission shall not interfere with public utilities when they are owned and operated by municipalities, and Trowbridge thereupon declared that the Federal Constitution was thereby violated. Representatives of the Home Telephone Company and the Pacific Light and Power Company, of Los Angeles, denounced the measure as an example of clear discrimination in favor of municipal ownership and civic corporations as against private firms and organizations. Briefs will be filed with the legislative committee by the various attorneys, setting forth their arguments against the clause which takes municipal-owned plants beyond the control of the Commission. Amendments will also be suggested which will cause such plants to come within the provisions of the act and under the jurisdiction of the Commission. On adjourning the committee agreed to meet again before the coming session of the Legislature, in order to make a final decision on the arguments made and to announce the amendments adopted.

### Lowell to Have New Pumping Station

Lowell, Mass.—A new pumping station, which will cost about \$22,000, is now in process of construction and will probably be completed about the first of March. The build-



Courtesy Lowell Sun.

ATTRACTIVE PUMPING STATION TO FACE BOULEVARD.

ing will be 31 feet in height, and with its roof of red tile and side walls of terra cotta blocks, will be an ornamental and useful improvement to the boulevard on which it will front.

### New Water Works System in Use

Park City, Utah.—The residents of Park City will commence using water from the new water works system on December 1. The whole system has been completed and more than 900 service connections have been made. The waterworks have been in course of construction since last May and have cost the city approximately \$63,000. The new reservoir, with a capacity of 10,000 gallons, is between Empire and King canyons, 100 feet higher than the highest point to be served by the system. The water is piped to the reservoir from the Alliance tunnel in a 10-inch main. The system will give the city a monthly revenue of \$1,500.

### Two-Inch Mains to Hydrants Not Large Enough

San Leandro, Cal.—Claiming that the two-inch pipes being connected with the fire hydrants by the Union Water Company are not large enough to afford the proper protection to the residents of San Leandro, the Fire and Water Committee of the Board of Trustees has ordered all work stopped until the matter could be settled. The majority of the hydrants already connected have been done with small pipe, and if larger pipe be ordered all these will have to be reconnected.

### Lowell Water Supply Greatly Improved

Lowell, Mass.—Samples of water from the new boulevard wells have been analyzed by the State Board of Health and have been found to contain less iron than does the old boulevard well water. The new wells on the boulevard are only test wells, but the water from the test wells is the same as will be pumped from the permanent wells and they will be installed just as soon as possible. The Water Board is working in conjunction with the State Board of Health on the proposition for new wells. The wells are to be located on the land acquired not long ago by the city, and they will be located on the opposite side of the boulevard from the present wells. The Water Board intends to install about 300 new wells in all, and with the addition of the new wells it is believed that the quality of Lowell's water supply will be much improved. The daily consumption at present in Lowell averages about 4,500,000 gallons, and that is considerably below normal. The normal consumption is about 5,500,000 gallons. The reason that the consumption is low at the present time is because the weather is not very cold and there is no longer any need of watering lawns, sidewalks, plants and other places and things. No complaints have been received of late as to the quality of the water. The cold weather killed the vegetable growth in the pipes, and that has a whole lot to do with the water. The crenothrix accentuates the iron in the water and it is much stronger, of course, in the growing seasons. The cold weather kills it.

### Marlin Considering Question of Control of Water Works

Marlin, Tex.—The control of the water works system is a question which is receiving much consideration at Marlin just now. Two reports from the Water Works Committee on this subject will be submitted to the City Council at the next meeting. The majority report favors the city becoming sole proprietor and exercising direct management over the system. The minority dissents on the ground that the private parties holding an interest in the plant exact an extravagant price for their portion.

### No Pollution in the Winston City Water

Winston-Salem, N. C.—The conclusion drawn by the manager of the State laboratory of hygiene at Raleigh, after he has made a careful analysis of a specimen of the city water from Winston in November, is that the water is unpolluted. Capt. T. L. Rawley, manager of the Water Department, received the report of the analysis last week and was much gratified to find that the report was one of the best ever received by him. He says that there is plenty of water and everything is in fine shape at the water works. Just as soon as the funds are forthcoming there will be some improvements made, however, so that the available supply may be handled better. Another filter will be put in and other improvements will be made. It is gratifying to note that fine reports have been received on the city water recently from other sources besides the State laboratory at Raleigh. A specimen of the water was sent to The Harris Laboratory in New York, where it was analyzed and the report came back that it was one of the finest specimens of water seen in New York in many a day.

### Manufactures Obtain Free Water Through Fire Service Mains

Tacoma, Wash.—That the city has been robbed of water by big industries which for years have obtained millions of gallons from fire service mains was the allegation of James Agner, superintendent of water mains, at a hearing before the Municipal Commission. Agner included many mills and manufacturing establishments in the list which he told the Commission were illegally taking water from the city supply. He estimated that \$100,000 worth of water had been wrongfully used within the last five years. Already steps have been taken, he said, to prevent further thefts. A complete investigation, however, will be undertaken by the Commission. In many instances, said Superintendent Agner, lax inspection and poor meter reading had been responsible for the long continuance of the alleged systematic thefts. At one plant two meters on the regular water main into the building were entirely out of order, and only an estimate of the water used was made and bills paid on that basis, he said. One of the meters was covered with clover, declared Agner. At the same plant, he said, he found two by-passes from the fire service main. The fire service mains have not been metered in the past, but will be hereafter. "In nearly every instance where water was taken from the city the various mills, factories and establishments have taken the water from the fire service mains," said Mr. Agner. "Ordinarily the fire service main is laid near the establishments by the city and a certain rental charged. The understanding, of course, is that the main shall be used only in time of fire. For years, however, it has been the practice to open the valves in these mains, fire or no fire, and use the supply without paying the city a cent. At times when the private water supply of the plants run low it has been customary to open the valve in the fire service main, which should be closed except in case of fire, to reinforce the private supply. In one instance a mill attached several lines of hose to a connection with a main and used the water to fill its boilers and also to use it in sluicing operations.

"I have stopped some of the attempts by placing meters on the fire service mains as well as on the regular mains. I have just begun to do this, however, and had intended placing meters to catch them all before they were aware of it. I wanted to get a meter reading and then use it as a basis for making up bills for water used in the past. A good part of the blame can be attached to poor inspection and also to unsatisfactory meter reading."

### Reversal of Current Stirs Up Sediment in Mains

Philadelphia, Pa.—Residents of the Northwestern part of the city have been entering complaints to Fred C. Dunlap, chief of the Water Bureau, regarding the sediment in the water supplied by the new water plant. Dunlap explained that the filtered water from the new Queen Lane filtration plant, which was recently turned into the mains, flows in the reverse direction from the old supply. All the incrustation on the pipes has been scaled off by the reverse flow and the higher pressure has stirred up the sediment in the pipes, with the result that the supply reaching the houses for several days will be worse in appearance than the raw water. The new plant has a maximum capacity of 70,000,000 gallons daily and an effective working capacity of 60,000,000 gallons. It has cost the city approximately \$2,000,000 to build the plant. Chief Dunlap, in a recent report to Director Harry A. Mackey, said that even this additional supply would not long suffice the needs of the city unless steps are taken to reduce the great waste of water.

### City Negotiates for Purchase of Water Plant

Plainfield, N. J.—Councilman F. E. Mygatt, G. S. Clay and F. L. Holt, a special committee from the City Council, will meet Frank Bergen, of the Plainfield-Union Water Company, at his office in Newark to make an offer of approximately a half million dollars for the local water plant. The Council recently adopted a resolution to that effect, but it is not expected that the company will accept. If it shall refuse condemnation proceedings will be begun to acquire a municipal water plant for the city.

### Macon's Municipal Water Plant Shows Profit

Macon, Ga.—The water plant has realized a profit in the first month of its ownership by the city of Macon. The report of the Commissioners to the Council shows that during October a net profit of \$1,401.78 was cleared, notwithstanding that much unusual expense was incurred. The detailed statement of the receipts and disbursements of the water plant has been made to the Commissioners by Secretary J. E. Guilford. This report showed the plant's income during October was as follows: Flat rate, \$4,941.07; monthly flat rate, \$145.32; meter rates, \$4,310.64; city of Macon (275 hydrants), \$901.03; city of Macon, \$74.76; total water sales, \$10,372.82. The expense of the Water Department, covering the operation of the station and the purchase of 538 tons of fuel, was \$3,484.16. During the month a total of 152,347,000 gallons of water were pumped and filtered. The monthly distribution for repairs was \$737.67. The cost of management and general operation was \$4,786.09. This included the item of \$2,654.17, interest on bonds. The salaries per month, \$663.06. The general expenses of the office were \$1,048.57, not including the salaries. The Commissioners are much elated over the showing of the plant during the first month of their administration, and believe that the report for November will be even better.

### Seattle Threatened by Water Famine

Seattle, Wash.—For a time the city of Seattle had practically no water protection in case of fire and the entire city suffered for want of water. An engineer, in bringing the famous Cedar River water to the city, piped it across a river which in certain seasons of the year becomes a raging torrent, on wooden piles. At flood the river carried the big pipes away and Seattle was waterless. Millionaires and poor alike carried water to their homes, some in casks in automobiles and others in lard pails and buckets, but all had to carry water. It will be a week or 10 days at least until the repairs can be made to the pipes, and then only if the river falls to its usual level. This is not probable with heavy rains threatening. The schools have shut down indefinitely. The law prohibited anyone in the city to take a bath either in a private residence, hotel, club or public bath. The available supply of mineral and charged waters were gobbled up from dealers by the wealthy. The city is shut off from transcontinental railroad service on account of landslides and washouts, the only connection being with Portland. The court house is without water and heat and the judges of the Superior Court have decided to hold no more sessions until conditions are relieved.



## STREET LIGHTING AND POWER

### Inspect Electrically Operated Water Works

Hartford City, Ind.—Two members of the City Council and I. H. Waters, superintendent of the municipal water plant, recently made a visit to Chicago at the expense of the Hartford City Lighting Company, the purpose of their visit being to inspect an electrically operated water works with the view of changing the motive power used here. At present the plant here is operated by steam. Long usage has rendered the boilers and machinery worthless, and before replacing them the Council decided to investigate the advisability of substituting a new motive power. The lighting company is interested to the extent that in the event the change is made it will furnish the current, hence its proposition to the Council to bear the expense of the trip to Chicago.

### Profitable Operating of Municipal Light Plant

Newark, O.—This city is in every way pleased in its municipal electric light plant and the saving that has resulted for the city of Newark. The first cost of the plant was \$65,000. It has 410 arc lights, making it one of the best lighted cities in the section. The itemized expense of operation for the first nine months of the present year totals \$4,095.27, the figures including salaries, upkeep, coal, oil, etc. Dividing the total itemized cost of the operation of the plant by the number of arc lights, it is apparent that the cost of each arc lamp during the past nine months has been nearly \$9.99. The city, however, pays itself \$30 an arc lamp per year.

### Up-to-Date Lighting Is Provided by City

Tacoma, Wash.—Following the receipt of a large supply of new 400 and 500-watt tungsten electric light globes, together with shade and socket equipment, the city electrician has been working overtime substituting the new globes in business establishments for the old and new style Nernst lamps. The improvement in lamps is marked and so popular have the new lights become that the light department is hardly able to make substitutions fast enough. The new lamps with shade and socket hung in place are put in stores and all business establishments down town without extra charge by the city in order to sell its current. The large tungstens are said to have several advantages over the old style and new style Nernst product. They are said to give a more pleasing light and to consume slightly less current.

### Progressive League Want Municipal Plant

Virginia, Minn.—It is expected that the Progressive League will continue its fight for immediate municipal ownership and will urge the Council to take immediate action to secure a proper valuation of the water and light plant so that voters may know in ample time before the election in February how much money will be necessary to handle the proposition. It is thought by members of the League that the Council will get busy at once, but a committee of League members will probably be appointed to represent that body before the Council to urge prompt action.

### Mammoth Power Plant Is Opened

Redding, Cal.—Twenty-one thousand horsepower of electrical energy was "born" in Shasta County when the Northern California Power Company started its new plant, one of the largest units in the State, at Coleman, on Battle Creek. The power-house, the machinery contained therein, the 11 miles of canal to convey 20,000 miners' inches of water, and the other equipment, cost nearly a million dollars. The new plant almost doubles the company's development, which now totals 47,000 horsepower, the other four plants combined developing only 26,000 horsepower to Coleman's 21,000. This power is distributed down the valley as far as Chico on the east side of the river and Arbuckle on the west side, the surplus being delivered in San Francisco over the wires of the Pacific Gas and Electric Company. The Northern California Power Company has commenced work on a far larger undertaking in the big bend of Pitt River, where 100,000-horsepower will be developed at a cost of \$4,000,000. This work is to be completed in two years.

### Councilman Suggests Using Non-Conductor Conduits

Roswell, N. M.—Councilman Cummins has suggested the use of fiber conduits for the wires for the proposed ornamental street electric lights, instead of metal, so as to avoid trouble when high power electricity is used for street cars, the fiber being a non-conductor of electricity.

### Mayor Installs Ornamental Lamp Posts

Waco, Tex.—Mayor H. B. Mistrot has had installed, at his own expense, two ornamental street lamp posts, to which clusters of five lights each are attached. They have been placed on North Fifth street, between Austin and Washington, and will be illuminated during the Cotton Palace. He has been working with a committee in an effort to have this plan of lighting used on Austin street, Waco's main business thoroughfare, for a distance of 13 blocks.

### Sioux City Best Lighted City

Sioux City, Ia.—The streets of Sioux City are now claimed to be better lighted than those of any city of twice its size west of the Mississippi. The new electroliers that have been placed by the business men have cast their light not only over our own streets, but have attracted the attention of commercial bodies of other cities. But there are many dark spots left that could be illuminated at a small expense. The Service Company would be glad to send a representative to any business man who wishes to install an electrolier in front of his place of business. The upkeep and operating expenses are but a small item in comparison with the actual good they will do.

### City Planning to Heat and Light Own Buildings

Baltimore, Md.—Another step toward obtaining for Baltimore a municipal lighting and heating plant was taken when Building Inspector Stubbs put some of his men to work drawing up specifications for the work of connecting up the City Hall, Court House and other municipal buildings with the pipe line pumping station. The station will be ready for operation by February 1. The approximated cost of the installation of apparatus to supply current for the city buildings will be \$15,000.

### City Chemist Tests Arc Lamps

St. Paul, Minn.—City Chemist Victor Roehrich is now making laboratory tests of the General Electric Company's flaming arc lamps, but it is said the Stave arc lamps have not yet reached the chemist. At the recent tests the Stave lamps made a materially better showing than the lamps of the General Electric Company, but it was agreed to make another test of the two lamps. The Board of Public Works has been assured the St. Paul Gas Light Company, which has the city lighting contract, will furnish the city with the best type of lamp.

### South Bend to Install Lights on Ornamental Posts

South Bend, Ind.—Electric lights upon ornamental posts, such as now adorn the remainder of the business portion of the city, will soon replace the system of arc lighting, in the "New Center" district, of South Michigan street. This decision was reached at a recent meeting of business men of the section. While the ornamental posts were decided upon it was also decreed that the posts should be a little higher than those elsewhere about the city, it being felt that the others were too short. In the two blocks of the "New Center" district also the posts will be painted white. Electric lights of the strongest incandescent power will be used. The arches will be retained until the posts are put in.

### City May Sell Lighting Plant

Romeo, Mich.—After making an inventory of the municipal electric lighting plant here, the Eastern Michigan Edison Company has submitted a proposition to purchase the same. The plant has never paid operating expenses since being installed, 12 years ago, and there is a bonded debt against the plant of \$15,000. In view of the fact that another engine will soon have to be purchased, which means another bond issue, the people generally seem to favor the sale of the plant, for which Edison company will pay \$18,000. The company asks for a 30-year franchise to light the street, and quote a price of \$18 per year for each 60-candle power tungsten lamp, and \$24 for each 100-candle power lamp. All-night service would be given and day service as well, while now the arc lights are discontinued at midnight and there is no electricity generated during the day.

## FIRE AND POLICE

### Would Prohibit Use of Rubber Hose

Huntington, W. Va.—The commissioners have been asked to take remedial action in the matter of providing an ordinance prohibiting use of rubber hose as gas connections. Recent fires attributed to the rubber connections have caused Fire Chief Davis to make an effort to secure the passage of an amendment to the present provision prohibiting the use of such material for the transmission of gas. The present city ordinance, while drawn carefully, does not contain the feature that will be urged by the head of the fire department.

### Conflagration Hazard Low in Detroit, Say Engineers

Detroit, Mich.—Detroit, with a population of 501,000 and growing rapidly, is pronounced reasonably safe as far as the conflagration hazard is concerned by the engineers of the National Board of Fire Underwriters. In the congested value district the potential hazard is moderate to high. Streets of good width, however, divide the district into several sections and buildings of fireproof construction form local fire barriers in a number of blocks. Although high winds are fairly frequent, there are a number of automatic sprinkler equipments, the fire department is strong and efficient, the water supply is classed as fair to good and is supplemented by fire boat or main service "so that a fire should be confined to the block or section in which it originates." The report says that the minor mercantile districts extend along main streets and should not be subject to spreading fires. Manufacturing plants and districts are scattered or not congested and the conflagration hazard is classed as from low to moderate. Residential portions of the city are largely frame with shingle roofs and consequently the flying brand hazard is severe. The report states that the water supply is from ample source, although the capacity of the water works is taxed almost to the limit, as is usual in rapidly growing cities. The fire alarm system is well maintained and fairly satisfactory. Detroit has a fairly level surface, streets are of good width, many are paved, but are only in fair condition. The average wind velocities are high, gales of wind are frequent and severe winter temperatures are common. The average number of fires and the average annual property loss per capita are both moderate.

### Fire Chief Agitates Fire Prevention

Sioux City, Iowa.—Working upon the theory that an ounce of prevention is better than several tons of cure, Fire Chief Geo. M. Kellogg is proposing to inaugurate a campaign for cleanliness. "What has the fire department to do with cleanliness? A great deal," said the chief. "Too many people permit rubbish or inflammable material to accumulate in their homes, business houses and factories. They are prolific sources of fire of 'unknown origin.' I can go around the city and gather up carloads of boxes and barrels filled with excelsior, shavings, rags saturated with oil, greasy overalls, coal, hay, sawdust, etc., inside and outside of the buildings, in the basement and in the attic. Sioux City property owners have lost thousands of dollars of property by fires in the last year caused by spontaneous combustion, and it is just such rubbish as this that does it. Children with matches are not nearly such a menace to property and life as grown folks with rubbish. We expect to visit every place within the fire limits and effect a general cleaning up of rubbish, and we expect to educate people as to the absolute necessity of keeping their places, inside and out, free from accumulations of rubbish. There should be absolute cleanliness not only in the parlor, but in the cellar and garret as well. There are two kinds of remedies for fire—those before, and those after the fire begins. If more attention were given to the first class, the second class would require less attention. The first approach of cold weather is generally prolific of big fires, and for this there are several reasons. Improper inspection and repair of stoves, furnaces and chimneys is the principal reason; and when cold weather necessitates the filling of the stove or furnace to its full capacity there is always danger of fire. The Christmas festivities frequently are attended by grief and mourning because the inflammable material of the Christmas tree of the old fashioned Santa Claus comes in contact with the tallow candles used to illuminate the tree."

### City Asphalt Plant Burns

Pittsburgh, Pa.—For an hour the other evening the lower Northside was filled with suffocating fumes of burning asphalt. The city asphalt plant at River avenue and Sycamore street caught fire from a gas stove. The watchman discovered it quickly and after turning in an alarm had another watchman notify the B. & O. office to stop all trains and also to send a locomotive to save cars on a siding. The building was of wood with galvanized sheeting. The loss, which includes the structure and much asphalt, is about \$15,000.

### School Installs Fire Alarm System

Harrisburg, Pa.—A complete electric fire alarm system has been installed in the Harrisburg public school building and teachers are giving fire drills to their pupils.

### New System Inaugurated at Fire Station

Wheeling, W. Va.—Announcement has been made that a new practice would be put in force whereby the fire alarm system will be tested every day at the Central fire station. The alarm will be turned in every evening at 4 o'clock from the different boxes, and will be registered at the above station. This new departure has been put in force so that the alarm boxes may be kept in perfect working order, and should the evening tests show any box to be out of condition, it can be repaired immediately.

### Fire Apparatus Tested

Charleston, S. C.—Chief Behrens, Assistant Chief Morris and Engineer Bicaise, of the Charleston Fire Department, have finished the annual work of testing the engines of the department, and pronounced them all in good working order, and reliable under reasonable conditions. The work of testing the big powerful pumps and fittings went on for several days. To be reported as in satisfactory condition, an engine must pump 300 gallons of water a minute, and it was this rigorous test that the apparatus responded to. Several of the newer engines went way above the minimum required, and all the regular apparatus made the required number at least. The hose has been tested under a high hydrostatic pressure recently, the probationers in the fireman's school examined and admitted, and now that the engines have been tested, the department is in fine condition for another year's efficient work.

## GOVERNMENT AND FINANCE

### "Greater Denver's" Civic Center Now Assured

Denver, Col.—The news that the State Supreme Court had finally handed down the long-delayed decision in the civic center case and opened the way for making the great project of a civic center a reality was received by a large majority of the people of the city with joy and satisfaction. It means placing in local circulation over \$2,500,000, the employment of idle labor and the other benefits that accrue from the starting of the work to the community in general. Business men were elated over the result, and naturally Mayor Speer and the other officials, who have labored long and earnestly in behalf of the great improvement, were more than delighted.

### To Borrow Money for Temporary Needs

Milwaukee, Wis.—The city may be compelled to borrow money to conduct the government to the end of the year, as was done last year, and in order to make the desired loans the council has been asked to empower Mayor Seidel and Controller Dietz to append their signatures to the necessary documents for the city. Last year the city was compelled to borrow \$180,000 to meet expenses until the tax money came in. This year a similar state of affairs exists. It was thought the city would not have to ask for any loans this year. The budget for this year authorized the issuance of \$2,330,000 in bonds, but only \$1,810,000 were issued, leaving \$520,000 unissued. "In this connection I desire to say that under the present laws the borrowing of money from the trust funds or other sources has been an absolute necessity for every administration in Milwaukee's history," said the controller. "In other words, when the taxes are paid in the months of December and January about 60 per cent. of the money goes toward paying the expenses of the city during the previous year, while about 40 per cent. is left for the ensuing year, barely enough to pay for the first five months of the new year."



### To Devise Means for Economy and Efficiency

Cincinnati, O.—The plan to have experts from the Bureau of Municipal Research go through the city departments with the idea of devising means of economy and efficiency in the operation of the departments, which has the financial backing of the Business Men's Club, will be put in operation at once. Six experts will be put to work at the city hall under the supervision of Associate Director Leach, of the bureau. The first work undertaken will be to get the departments' estimates up to date in preparation for the semi-annual appropriation ordinance for the first half of the year. The mayor's budget estimates were based on the expenditures of the departments up to April 1. These estimates will now be brought up to November 1. The arrangements for the work were made with Mayor Schwab by Director Leach.

## STREET CLEANING AND REFUSE DISPOSAL

### School Children Clean Town

Brockton, Mass.—Back yards in Brockton are beginning to look tidy and the entire city has taken on a clean aspect as a result of the clean-city campaign conducted by the school children. Several small armies of youngsters have been at work and nearly every section of the city has been covered. For the most part the children confined themselves to picking up paper and tin cans. In many sections the paper was burned and the boys had a certain amount of fun out of the work. As soon as schools closed brigades were formed and with rakes, spears and the like the young folks started out to make the dirt fly.

### Louisville Has Successful Clean-Up Day

Louisville, Ky.—About 1,700 cartloads of tin cans, mattresses, grapevines, limbs of trees, ashes and other refuse were hauled to the various city dumps as a result of the special clean-up days. The refuse had been collecting since the spring cleaning days. The work was under the auspices of the Woman's Outdoor and Art League, with the cooperation of the city departments, especially the Street Cleaning Department. Superintendent William H. Shumate worked hard with the committee from the woman's league and had the work well in hand. He announced that during one day 797 cartloads of refuse had been hauled to the dumps by the extra force of about 100 men and eighty wagons, and that the regular force in addition had moved 145 loads. About the same amount was carted away the following day. The work was regarded as a success.

### Garbage Plant Tries New Deodorant

Bridgeport, Conn.—The first tests of a modern deodorant, devised by Dr. J. C. Bayles, M.E., Ph.D., a former New York health commissioner and an expert in sanitary matters, took place at the garbage reduction plant in the presence of C. C. Fischer, proprietor, James MacDougall, of Stamford, agent for Dr. Bayles, and Commissioners Dr. G. W. Osborn, Frank Bogart and J. M. Lund. On account of other engagements, Mayor Clifford B. Wilson and Commissioner Joseph Whitcomb were unable to attend. As far as the commissioners were able to determine the test was entirely satisfactory, although it was expressed that perhaps it might be more conclusive could the test have been made during the hot summer weather when the complaints of odors were more serious. The test was made inside, first in the garbage reception shed, then down below in the cellar and finally in the digestors and other parts of the plant. As the powder was sifted over the unsavory and ill-smelling mass the repugnant odor of raw garbage disappeared as if at the touch of a magician's wand. The test was officially under the direction of the health commissioners and as the result of ordering Contractor Fischer, some time ago, to secure some brand of deodorant which would effectually prevent the odors protested against so strenuously last summer by East Side residents. The deodorizing agency is in dry-powder form, the water necessary for its work being contained in the garbage or other material upon which it is to be used. In the tests it was freely used and the use seemed to have satisfactory results. However, before it receives the final endorsement of the health commissioners a series of tests are to be made under all conditions.

### Clean Streets With Hose

Falls City, Ore.—The City Council has adopted a new method for cleaning the streets of mud and dirt which has collected on the macadam. The large three-inch fire hose with 200 pounds pressure is turned on the streets and all mud and filth swept away.

### Garbage Concern Asks City to Take Plant

Los Angeles, Cal.—Driven to the verge of bankruptcy by the pressure of its creditors and having reached the end of its resources, the V. D. Reduction Company, by T. C. Lynch, has notified the Board of Public Works that it could no longer continue to collect the city's garbage and told the board the city would have to take charge of the plant. The company asks the city to take over its teams, wagons and harness, and pay it \$1,000 a month for the use of this equipment. The city is to obligate itself to deliver the garbage to the loading station and turn it over to T. C. Lynch, who will remove it.

## RAPID TRANSIT

### Offers Detroit 3-Cent Fare

Detroit, Mich.—The Detroit United Railway has agreed to pay a forfeit of \$5,000 a day, under a million-dollar bond, for every day the city is kept out of possession of the traction lines after the city has obtained legislative authority to operate them and has given six months' notice of intent to purchase. A franchise containing this agreement will be submitted to the Common Council and later probably to a referendum vote. The franchise provides eight tickets for 25 cents and universal transfers, except between 8 p. m. and 5 a. m., when the fare is six for a quarter. The new franchise, with all present rights of the company, would expire in 1924.

### To Stop at First Crossing

Muncie, Ind.—In connection with its proposed new traffic ordinance, this city will probably enact a clause compelling street and interurban cars to stop at the first crossing of intersecting streets instead of at the second crossing, as now. It is said that many accidents have resulted because persons from other cities were uninformed as to the side of the street on which a car may stop.

### Citizens May Build Car Line

Washington, D. C.—Should the Capital Traction Company or the Washington Railway and Electric Company fail to provide for a cross-line connecting the Eighth street S. E. and Seventh street S. W. lines within the next year it is understood to be probable that the Southeast Washington Citizens' Association will attempt to capitalize and construct such a line. At a recent meeting of the association Henry C. Emerich was appointed to investigate the feasibility of the incorporation of a street railway line connecting the two sections of the city.

### A Newark-New York City Electric Railway

New York, N. Y.—A new railway was opened on Nov. 26, 1911, by the Pennsylvania Railroad. The road extends from a new terminal station in the city of Newark, across the Passaic River, the Hackensack Meadows and the Hackensack River on a new line and joins in Jersey City the subway line of the Hudson & Manhattan Railway, on whose tracks it crosses under the Hudson River into the terminal station at Fulton street, New York, and by the uptown line of the same company, under Sixth avenue to Thirty-third street. Multiple unit trains operating on third-rail transmission will be run on about a ten-minute schedule between the two cities, at the regular fares now prevailing for the steam railways.

### Mayor Thinks Chicago Can Beat World on Cars

Chicago, Ill.—Mayor Harrison recently declared that Chicago would have the best traction system in the world if a valuation fair to the city could be made on elevated lines and a merger of all traction interests brought about. Valuation of these lines is what has delayed subway work, according to Mayor Harrison, but if the valuation reached is equitable to all concerned, he believes it will result in only good for Chicago. "If a valuation can be reached that will be fair and equitable to all concerned," he said, "we will have the best traction system in the world."

## MISCELLANEOUS

### His Mayor's Job Costly

Pasadena, Cal.—When Mayor Thum retires at the conclusion of his term of office—he declares he will never be a candidate for mayor again—his bank account will be depleted \$10,000. With a salary of \$3,000 per year, the Pasadena mayor is paying out money at the rate of \$8,000 per year to support various offices which, he believes, belong to every well regulated city. Maintaining that every city can profit in the long run by paying the expenses of an efficiency bureau, the mayor has created such a bureau, and its support costs him \$2,700 per year. He pays its head, Robert S. Allan, \$2,000 per year for his services and \$750 for an assistant.

### St. Louis Buys Two Automobile Ambulances

St. Louis, Mo.—The City Hospital Department has received two new automobile ambulances recently ordered. The city now has five automobile ambulances and will dispense with several teams and old-fashioned ambulances.



Courtesy St. Louis Globe-Democrat.

NEW AMBULANCE, ST. LOUIS HOSPITAL DEPARTMENT.

The automobiles were made by the Dorris Automobile Company and are a departure from the specifications heretofore adhered to. The wheel base is 132 inches and the body is wider by 6 inches than the old machines. They cost \$2,600 each.

### City Advertising

Omaha, Neb.—The mayor and council of the city of Omaha have issued a booklet, prepared under the direction of George W. Craig, city engineer, which epitomizes the financial, commercial and manufacturing resources of the city. The folder consists of ten pages of a size to fit an ordinary envelope. There are two fine reproduction photographs of the wholesale and retail business districts. The reading matter consists of brief paragraphs regarding the educational facilities, public utilities and business statistics.

### Plants Trees With Dynamite

St. Louis, Mo.—Dwight Davis, park commissioner of the city, is planting trees with dynamite. Instead of using spades to dig holes in which transplanted trees are set, the workmen drive a 2-inch pipe into the ground, fill it with dynamite and light the fuse. The downward explosion makes a fine hole to put the tree in. The explosive loosens the soil in a way which enables the trees to take root more quickly than if spades were used.

### Lynn Advocates Municipal Market and Direct Purchases

Lynn, Mass.—Two hundred representative citizens gathered in the Council Chamber at a so-called high cost of living hearing to discuss ways and means of reducing the food bill of the average citizen. The question of the establishment of a municipal market where groceries and provisions could be purchased direct from the producers without the middlemen's charges was discussed. Legal lights agreed that such an act would be unconstitutional, the Supreme Court of Massachusetts having so decided in 1902, when the question of the establishment of municipal coal yards was agitated. Mayor William P. Connery therefore suggested that the citizens urge their representatives in the Legislature to take action looking toward the resubmission of the question to the Supreme Court, the personnel of which has materially changed since 1902.

### Oklahoma City Wants Municipal Store

Oklahoma City, Okla.—A municipal store, bonded by the city government, or perhaps by the State of Oklahoma, in case it develops that the municipality has not the power, is a plan now said to be on foot for reducing the cost of living in Oklahoma City. An initiative petition with that end in view is now being prepared, it is said, and will be circulated for signatures soon. It is claimed that Oklahoma is the only State in the Union where such a store can be operated under the Constitution, the organic law of the State providing that the State may enter into any business with the sole exception of agriculture. The parties at the head of the movement claim that the city derives this power from the Constitution as a part of the State government, there being nothing in the charter prohibiting it.

### Offer to Give City Land for New River Channel

Cleveland, O.—The co-operation of upper Cuyahoga Valley property owners may result in the turning over to the city, free of cost, a strip of land nearly two miles long for the cutting of a new channel from a point just beyond the present limits of navigation to Harvard avenue S. E. Big owners of real estate in the upper valley, who appeared at a meeting of the City River and Harbor Commission recently, expressed their willingness to co-operate in an even exchange scheme which will enable the city to take over the needed land without cost.

### Illinois Capital to Have Municipal Market

Springfield, Ill.—A city produce market, with a possibility of two, is one of the innovations that will follow the adoption of the commission form of government by the city of Springfield. A majority of the five commissioners have expressed themselves in favor of the project. It is believed that the market, or markets, will be established as soon as suitable locations can be obtained. It is declared by friends of the project that considerable revenue will be derived from the sale of space in the municipal market, and, in addition, the householder will be protected from imposition by dishonest peddlers. The Springfield Federation of Labor is taking an active part in the establishment of the city market place.

### Municipal Lecture Course

Bloomdale, O.—What is believed to be the first municipal lecture course in Northwestern Ohio has been arranged by the mayor and council of this village. It will be opened with the Pollard Company. On December 2 Albert Milton Dixon will lecture on "The Wheel that Goes Round"; December 30, Colonel G. A. Gearhart will lecture on "Civic Righteousness, or Footprints of the Centuries," and on February 17, the Parland Newhall Company will give a concert.

### Advertising Men Wish Sign Inspector Appointed

St. Louis, Mo.—At the request of the St. Louis Advertising Men's League, Councilman Paule has introduced in the City Council a bill which would allow illuminated signs to project over sidewalks more than 18 inches, the present limit. Street Commissioner James C. Travilla, on request, recently informed the House of Delegates many such signs are now in place, especially on hotel awnings, for which there is no permit or authorization by ordinance. The proposed ordinance provides every sign shall be illuminated at least from sunset until 11:30 p. m. Provisions are made the signs shall be of noncombustible material. No sign may extend more than 8 feet from a building. No vertical projecting illuminated sign shall be more than 3 feet wide or 4 feet high, nor project more than 5 feet from the building line, according to the proposed ordinance. It is provided that the commissioner of public buildings shall be empowered to issue permits for the construction of signs, and each sign owner shall give a bond of \$5,000. The building commissioner is instructed to inspect each sign once a year. For special occasions, such as celebrations, the mayor is given permission to authorize the erection of illuminated signs, to be in service not more than thirty days. A new position, that of sign inspector, under the building commissioner, is created in the bill. He is to receive \$125 a month. A fine provision ranging from \$5 to \$500 is arranged for violators of the proposed ordinance.



## LEGAL NEWS

### A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

#### Excavation in Street—Duty of City—Permit

*City of Rome v. Davis.*—Where an excavation is made in a public street by permission, or at the command of the proper municipal authority charged with the supervision of the street, the duty of seeing that the excavation is properly safeguarded rests upon the municipality. In such a case it is not necessary to show that the city had notice of the condition of the street, because the work was to all intents and purposes done by the city itself, and the city is charged with knowledge of the exact condition. Even though a permit be required to enable one to make excavations in the public streets of a city, and generally such a permit would be necessary as evidence that the work be done, still the necessity of a permit is obviated, where the superintendent of public construction of a city, who by law has the supervision of all work upon the streets and the right to grant permits, either directs or expressly sanctions an excavation upon the street. —Court of Appeals of Georgia, 70 S. E. R., 594.

#### Acts of Officers—Streets—Liability

*Hewitt v. City of Seattle.*—The liability of a city for injuries caused by defective streets is not limited to injuries caused by structural defects or obstructions, so that a city would be liable for injuries to one who was negligently run over by an automobile driven by the superintendent of the street department while in the exercise of his official duties. —Supreme Court of Washington, 113 P. R., 1084.

#### Vested Rights—Municipal Electric Plant

*Muskegon Traction & Lighting Co. v. City of Muskegon et al.*—Under the Muskegon charter, as amended by Loc. Acts 1901, permitting the city to issue electric light bonds and requiring that a sinking fund therefore be created, to be made up of amounts from the plant's revenue and from the contingent fund to be fixed by the council, a resolution creating the fund on the establishment of the plant is not invalid for providing for payment of \$4,000 annually from both sources; it being impossible to determine in advance how much revenue from the plant will be available, and it being contemplated by the act that the amounts be apportioned from time to time. Under Constitution authorizing municipalities to establish electric light plants, etc., the Muskegon charter, as amended by Loc. Acts 1901, permitting the city to establish such plant, is not unconstitutional as infringing vested rights of the company holding an unexpired franchise to supply lights, etc., though the undertaking may result in loss to the city as well as the company. —Supreme Court of Michigan, 132 N. W. R., 1061.

#### Contracts—Submission to Voters—Validity

*Americus Ry. & Light Co. et al. v. Mayor, etc., of City of Americus.*—Where municipal authorities desired to enter into a contract whereby the other contracting party should supply water for the term of 20 years to the city and its citizens, the municipality to agree to pay for the water used by it at a certain rate for the term mentioned, and whereby the other contracting party was to furnish to the city electric light for the same period, and the city was to pay therefor at a certain rate per annum, and the other party was also to agree to build and operate a street railroad in the city, and where the entire contract was submitted to the voters to be voted on at one time, without any opportunity to vote on the different propositions separately, such submission was illegal. Where, under a submission such as that above stated, the municipal authorities entered into a contract for electric lights and a water supply for 20 years, and the building of a street railroad, and just before their terms of office expired sought to extend the time within which the other contracting party might comply with its contract, upon the accession of their successors in office the municipal corporation could file an equitable petition to have the contract declared void and to have it canceled. —Supreme Court of Georgia, 70 S. E. R., 578.

#### Public Improvement Ordinance

*Village of Norris v. Lyon.*—An ordinance for a local improvement, authorizing the village attorney to draw from the village treasury the amount necessary to pay the compensation, damages, and costs, does not confer a wrongful authority on the attorney, but authorizes payment to him only out of money lawfully appropriated. —Supreme Court of Illinois, 96 N. E. R., 236.

#### Defective Street—Open Ditch

*Sweetman v. City of Green Bay.*—Evidence held to sustain finding that an unguarded ditch outside the traveled way was a dangerous defect in a street, under the rule that actionable defects may exist outside the traveled track of a highway, depending on their situation and condition. —Supreme Court of Wisconsin, 132 N. W. R., 1111.

#### Street Improvement Assessment District—Extent

*In re Jackson Street in City of Seattle. Roe et al. v. City of Seattle.*—By petitioning for a street improvement of a certain width, property owners estopped themselves to attack a special assessment under Laws 1907, as amended by Laws 1909, on the ground that the improvement is unusually and unnecessarily wide. The Supreme Court will not disturb the boundaries of a street improvement assessment district if there is ground for different opinion as to the proper boundaries. —Supreme Court of Washington, 113 P. R., 1112.

#### Defective Sidewalks—Notice

*Roney v. City of Des Moines.*—Where a sidewalk has been constructed in a populous part of a city, there is a broad presumption that the city either built the walk or assumed control thereof. It is only where a city sidewalk was properly constructed in the first instance and afterwards became dangerous and out of repair that notice to the city, actual or constructive, of the defect, must be shown to authorize a recovery for injuries to a pedestrian by reason of the defect. Evidence held to justify a finding that a sidewalk in defendant city by which plaintiff was injured was constructed in a defective manner in the first instance. —Supreme Court of Iowa, 130 N. W. R., 396.

#### Special Assessments—Appeal

*City of Chicago v. Marsh et al.*—In proceedings to confirm a special assessment, the filing of objections to the merits amounted to a general appearance, and waived an insufficient publication notice. On appeal from a confirmation of a special assessment, the city cannot be awarded damages, under Hurd's Revised Statutes on the ground that the appeal was for delay. A special assessment cannot exceed the benefit to the property. An assessment cannot be made a personal liability against the owner. —Supreme Court of Illinois, 96 V. E. R., 350.

#### Change of Street Grade—Damages—Benefits.

*Bramlett v. City Council of Greenville.*—Under Act December 22, 1885, incorporating a city, requiring it to pay damages for changing grade of streets and providing for the appointment of commissioners to assess the damages, general and special benefits resulting from a change in grade of a street must be considered in estimating the damages, and where the benefits equal or exceed the damages, the abutting owner has suffered no loss, and, where the abutting owner proves substantial damages, the city may prove benefits. —Supreme Court of South Carolina, 70 S. E. R., 450.

#### Street Railway Franchise—Federal Question

*Seattle, R. & S. Ry. Co. v. City of Seattle et al.*—Where ordinances granting a city railway franchise reserved a conditional right of repeal in case the franchise was not operated in accordance with the provisions of the ordinances, a determination of the city council of the question of fact that the grantee had violated the ordinances, and that they should be repealed, was not conclusive, and hence a suit to restrain the city and its officers from repealing the franchise ordinances, and from enforcing such repealing ordinance on the ground that it constituted an impairment of complainant's contract rights in violation of the federal Constitution, involved a federal question and was therefore within the jurisdiction of a federal court. —United States Circuit Court, 190 F. R., 75.

## NEWS OF THE SOCIETIES

**American Association for the Advancement of Science.**—The following papers will be read before Section D, devoted to highway engineering, Washington, D. C., December 29: "History of the Washington Bituminous Concrete Pavements," Captain Martin Brooke, Engineer-Commissioner of the District of Columbia, Washington, D. C. "History of Tar Concrete Pavements in Ontario," W. A. McLean, Provincial Engineer of Highways of Ontario, Canada. "Surface Treatment of Park Roads," Col. Spencer Cosby, Colonel U. S. Army in Charge of Buildings and Grounds, Washington, D. C. "Oyster Shell Roads," Major Walter W. Crosby, Chief Engineer State Roads Commission, Baltimore, Md. "The Chemistry of Modern Highway Engineering," Prevost Hubbard, Chief Division of Roads and Pavements, The Institute of Industrial Research, Washington, D. C. "A Review of the Use of Bituminous Materials in the Construction and Maintenance of American Highways During 1911," Arthur H. Blanchard, Professor in Highway Engineering Columbia University, New York City. "Organization of the Highway Maintenance Department of the Borough of the Bronx," William H. Connell, Assistant Commissioner of Public Works, Borough of the Bronx, New York City. "Organization of the Engineering Department of Coleman du Pont Road, Inc.," Frank M. Williams, Chief Engineer Coleman du Pont Road, Delaware. "Organization of Convict Labor on the Virginia State Highways," P. St. J. Wilson, State Highway Commissioner of Virginia, Richmond, Va. "Cost of Road Building with Convict Labor," Dr. Joseph H. Pratt, State Geologist of North Carolina, Chapel Hill, N. C. "Utilization of Motor Truck Train in the Maintenance of Trunk Highways," Logan Waller Page, Director Office of Public Roads, Washington, D. C. "Pipe Systems in Streets," C. E. Bolling, City Engineer of Richmond, Va. "Street Asphalt Paving Mixtures," H. B. Pullar, Chief Chemist the American Asphaltum and Rubber Company, Chicago. "Some Limitations of Distributing Machines," Henry B. Drowne, Instructor in Highway Engineering, Columbia University, New York City. "Impact Testing Machine for Bituminous Binders," Walter H. Fulweiler, Engineer in the Department of Research, United Gas Improvement Company, Philadelphia. "Changes in Pitch Under Exposure and Traffic," Major Walter W. Crosby, Chief Engineer State Roads Commission, Baltimore, Md. "Value of Blown Asphalts and Their Manipulation," H. B. Pullar, Chief Chemist the American Asphaltum and Rubber Company, Chicago. "Method for the Determination of Centrifugal Free Carbon in Bituminous Compounds," Walter H. Fulweiler, Engineer in the Department of Research United Gas Improvement Company, Philadelphia. "Voids in the Aggregates of Bituminous Concrete Pavements," Arthur H. Blanchard, Earl R. Donle and Clifford M. Hathaway, Columbia University, New York City. The program for Saturday, December 30th is as follows: Saturday morning: Investigation of the plants of the Office of Public Roads and the Institute of Industrial Research and inspection of the experimental bituminous surfaces and bituminous pavements at Chevy Chase. Sat-

urday afternoon: Inspection of the experimental sections of bituminous pavements on Park Heights Avenue, Baltimore, Md.

**American Institute of Chemical Engineers.**—A determined movement for a new building for the United States patent office, for the creation of a patent court or board of appeals, and for other improvements in the patent system of this country will be the feature of the semi-annual meeting of the American Institute of Chemical Engineers at the New Willard Hotel, December 20-23.

More than 100 prominent engineers from all parts of the country will attend. Various subjects dealing with chemistry, the patent situation, and engineering problems in general will be discussed. The government machinery will be turned over to the members to aid them in getting first-hand information on the operation of the various engineering divisions.

The members of the institute are aroused over the danger in leaving the vast number of patent records in the old building, and will try to impress Congress with the necessity for a new structure. They say the inventors of the country pay a large amount to the government annually in fees and are entitled to better conveniences.

They will also protest against the present methods of handling appeals in patent cases. Several speakers will dwell on the injustice of having appeals taken to various circuit courts. They will point out that there have been so many conflicting opinions rendered in patent cases that a court is needed to thresh out the entire question and bring order out of chaos. It is probable that Congress will be asked to allow the United States Commerce Court to handle patent appeal cases.

Among those who will address the meeting are Clarence Hall, of the bureau of mines; Richard K. Meade, Ludwig Thiele, S. F. Peckham, Dr. F. W. Frerichs, John C. Minor, Jr., Commissioner of Patents Moore, Walter D. Edmonds, R. N. Kenyon, F. G. Wheeler and J. C. Olsen. Dr. Frerichs is president of the institute and J. C. Olsen secretary.

Visits will be paid to the testing grounds at Indian Head, several steel plants in Baltimore, and other places of scientific interest in and about Washington. In addition to the business session many social features have been arranged, including a banquet at the Willard and a reception at the White House by President Taft.

**American Institute of Electrical Engineers.**—At the regular monthly meeting, December 8, Gus A. Maier, of the General Electric Company will read a paper on "Methods of Varying Speeds of Alternating Current Motors." F. L. Hutchinson, acting secretary, states that an innovation will be introduced at this meeting. He says: "The meetings and papers committee has felt that there is a demand on the part of a large number of members who came to Institute meetings for an opportunity to meet each other and to discuss matters of interest. This informal reunion usually takes place in the lobby at the opening of the evening and often detains many members from the reading of the paper, or draws them from the discussion later in the evening especially if the meeting lasts until late. Feeling that it would contribute to the reading and the discussion of the paper, and would also meet the demand for

intercourse among the members and serve to increase the attendance and general interest in Institute affairs, the meetings and papers committee has arranged to start promptly the reading of the paper at 8.15 p. m., and to adjourn at 10 o'clock, at which time the tenth floor will be thrown open and the members will go from the auditorium to meet each other in the Institute rooms. Should any prefer to continue the discussion in the auditorium it will be arranged that they may do so. Light refreshments will be served, and if the innovation is a success it will be continued."

**Engineers' Society of Western Pennsylvania.**—Members of the society, to the number of 200, were guests at the Cambria Steel Company, Johnstown, Pa., November 25, making an extended inspection of the mammoth works. They were accompanied by a group of 25 Cambria Steel officials, headed by President Charles S. Price. The visitors first viewed the wire and rod mill. The rest of the inspection tour was made over the interworks railway, three gondola cars being provided. The tour included the air compressor house, blowing engine house, machine shop and the mills during the forenoon.

Short addresses were made by President Charles S. Price of the Cambria Steel Company, President Walther Riddle of the Engineers' Society, and Superintendent H. C. Welle of the Cambria Company. In the afternoon the party entrained for a visit of the upper works, which included the Gaultier plant, coke plant, Franklin plant and other departments in that vicinity.

**Kansas State Fire Prevention Association.**—At a meeting of the Commercial Club, Topeka, November 22, thirty-five delegates were present from various cities and towns in the State, besides local insurance men and others. That much of the fire loss in this country could be avoided was the contention of all the speakers. The chairman of the committee on publicity and the preservation of human life submitted a report on fire prevention in places of amusement and other public buildings. It was announced that five cities in Kansas have been inspected by special committees in the last six months, and a recommendation was made that Lawrence and Independence be inspected immediately. When a city is inspected first the defects are pointed out to individual property owners, and then a meeting is held with the city authorities with a view to having ordinances passed for the protection of the city from loss by fire. The committee on laws and ordinances recommended that a series of ordinances for towns and cities be drafted looking towards the prevention of fire and the loss of life. At a banquet in the evening, addresses were made by E. R. Townsend, insurance engineer, Chicago; Robert Stone, M. W. Van Valkenburg, Kansas City, and Earl Akers.

**New Jersey Sanitary Association.**—The thirty-sixth annual meeting was held at Lakewood, November 24-25. The officers elected were as follows: President, John B. Smith, of New Brunswick; first vice-president, Morris R. Sherrerd, Newark; second vice-president, Dr. B. Van Doren Hedges, Plainfield; third vice-president, J. Brognard Betts, Trenton; secretary, Dr. James A. Exton, of Arlington (re-elected); treasurer, George T. Olcott, East Orange (re-elected); to succeed Mr. Betts as chairman of the executive council,



Clyde Potts, of Morristown. Chester H. Wells, of Montclair and A. A. Woodhull, of Princeton, were added to the executive committee.

Morris Sherrerd, chief engineer, Newark, N. J., and consulting engineer State Water Supply Commission, read a paper on "Some Features of the Larger Water Supplies of the State," Dr. H. E. Stearns read a paper on "Progress Toward the Control of Animal Infection in the State and Its Relation to the Public Health." Concerning the milk supply, he said:

"A certified milk is necessary and serves a great purpose, but a broader work is the insuring a general milk supply safe from its foundation, which foundation is its source, the dairy cow. Consequently the dairy cow must, first of all, be a healthy animal, at least free from tuberculosis. In spite of the efforts of the cattle shippers and dairymen in general, backed by some few veterinarians, to belittle the tuberculin testing of cattle, great progress has been made during the last few weeks by the Tuberculosis Commission toward the suppression of the practise of importing diseased cattle."

Samuel A. Greely, recently of Milwaukee, and now engaged in engineering work in South America, read a paper on "Some observations on the Collection and Disposal of Garbage."

**National Association for Preventing Pollution of Rivers and Waterways.**—The annual convention of the association will be held at McCoy Hall, Johns Hopkins University, December 13. Calvin W. Hendrick, chief engineer Baltimore Sewerage Commission, 904 American building, Baltimore, Md., chairman of the association, has issued the following program: Morning Session—Business of the association. Afternoon Session—Inspection trip to the Sewage Disposal Works of Baltimore, and an opportunity to see how sewage can be purified before discharging it into rivers and waterways. Evening Session—Papers and discussions by those present. Dr. William H. Welch, of Baltimore, on "The Sewerage Question from a Medical Standpoint." Mr. John D. Watson, of Birmingham, Eng., on "Sewerage with Reference to European Conditions." Mr. H. de B. Parsons, of New York, on "The Sewerage Status in the United States." Prof. C. E. A. Winslow, of New York, on "Practical Possibilities in the Purification of Municipal Sewage." The object of the association is to create public sentiment to such an extent that laws will be passed by all the States compelling communities, both large and small, to properly purify their sewage before discharging it into streams or other waterways; also to secure the aid of the United States government by the creation of a board to assist in adjusting interstate sanitary matters.

**Indiana Federation of Commercial Clubs.**—A committee of the Indiana Federation of Commercial Clubs, at a meeting in Indianapolis, November 25, approved the draft of a bill, which proposes to make sweeping changes in the method of government in cities of the State and which is intended to be presented to the next general assembly in 1912. The proposed bill was presented by T. F. Thieme, of Fort Wayne, chairman of the committee, who presided at the meeting. The essential features of the plan were included in a bill introduced in the 1911 Legislature by Senator Greenwell.

## Calendar of Meetings

### December 4-9.

**American Public Health Association.**—Annual Convention, Havana, Cuba.—William C. Woodward, M.D., Secretary, District Bldg., Washington, D. C.

### December 5-8.

**American Society of Mechanical Engineers.**—Annual Convention, New York City.—Calvin W. Rice, Secretary, 29 W. 39th St., New York City.

### December 11-13.

**Association of American Portland Cement Manufacturers.**—Annual Meeting, New York City.—Percy H. Wilson, Secretary, Land Title Bldg., Philadelphia, Pa.

### December 12-14.

**American Institute of Architects.**—Annual Convention, Washington, D. C.—Glenn Brown, Secretary, The Octagon, Washington, D. C.

### December 20-22.

**American Institute of Chemical Engineers.**—Annual Meeting, Washington, D. C.—J. C. Olsen, Secretary, Polytechnic Institute, Brooklyn, N. Y.

### December 27-January 3.

**American Association for the Advancement of Science.**—Annual Meeting, Washington, D. C.—L. O. Howard, Secretary, Smithsonian Institute, Washington, D. C.

### January 6.

**Pacific Northwest Society of Engineers.**—Annual Meeting, Seattle, Wash.—Joseph Jacobs, Secretary, 803 Central Bldg., Seattle, Wash.

### January 9.

**American Society of Engineering Contractors.**—Annual Meeting, New York City.—J. R. Wemlinger, Secretary, 13 Park Row, New York City.

### January 9-11.

**Michigan Engineering Society.**—Annual Meeting, Lansing, Mich.—Alba L. Holmes, Secretary, 574 Wealthy Ave., Grand Rapids, Mich.

### January 16.

**Engineers' Society of Western Pennsylvania.**—Annual Meeting, Pittsburgh, Pa.—Elmer K. Hiles, Secretary, 2811 Oliver Bldg., Pittsburgh, Pa.

### January 17-18.

**American Society of Civil Engineers.**—Annual Meeting, New York City.—Chas. Warren Hunt, Secretary, 220 W. 57th St., New York City.

### January 24-26.

**Ohio Engineering Society.**—Annual Meeting, Cleveland, O.—Clyde J. Knisely, Secretary, New Philadelphia.

### January 29-February 3, 1912.

**Second Annual New York Cement Show.**—Madison Square Garden.—J. P. Beck, General Manager Cement Products Exhibition Co., 72 W. Adams St., Chicago, Ill.

### February 21-23.

**Fifth Annual Chicago Cement Show.**—J. P. Beck, General Manager Cement Products Exhibition Co., 72 W. Adams St., Chicago, Ill.

### March 14-21.

**First Annual Kansas City Cement Show.**—Convention Hall.—J. P. Beck, General Manager Cement Products Exhibition Co., 72 W. Adams St., Chicago, Ill.

## PERSONALS

O'NEILL, JOSEPH, Associate Member of the American Society of Civil Engineers, who has been City Engineer of Leavenworth, Kan., since April, 1909, has tendered his resignation, to take effect January 1, 1912. His successor has not yet been appointed.

CALDWELL, JOSEPH PEARSON, Charlotte, N. C., a well-known editor and politician and one time Mayor of Charlotte, died at his home, November 23.

CHERRY, W. I., Atlantic City, N. J., has resigned the presidency of the United Paving Co., and also from the board of directors. W. E. Shadelford, now vice-president, will succeed Mr. Cherry as president.

KELLY, P. HARRY, Memphis, Tenn., has been elected Vice-Mayor and Fire and Police Commissioner.

SPLAWN, MAYOR, A. J., North Yakima, Wash., who is acting as Chief of Police, will also assume the office of Police Magistrate.

TERRY, ALFRED H., Bridgeport, Conn., has been appointed City Engineer.

HORTON, GEORGE W., Baltimore, Md., Chief of the Fire Department, after a service of nearly 50 years, is to be retired on a pension.

GREEN, GEORGE W., Reading, Pa., has been appointed Chief of Police.

DYER, GEORGE, Lima, O., has resigned as Mayor of that city and will accept the superintendency of the Sandusky division of the Lake Erie & Western Railway.

HASKENS, CARYL DAVIS, Schenectady, N. Y., one of the most prominent electrical engineers in the United States, died at Salt Lake City, Utah, on November 18th.

AMES, DR. A. A., Minneapolis, Minn., a former Mayor of Minneapolis, died November 17, in that city.

SAVAGE, W. R., Wellington, Kan., who served three terms as Mayor of that city, died on November 18.

The following Mayors have been elected:

### OHIO

Bratenahl—R. M. Ireland.  
Cardington—D. T. Diamond.  
Cedarville—I. G. Bull.  
Chagrin Falls—D. W. McGlenen.  
Columbiana—C. Stoffer.  
Crestline—J. J. Tischler.  
Delphos—J. D. Williams.  
Dennison—E. A. Wolf.  
Dover—G. Fortlage.  
East Cleveland—J. R. McQuigg.  
Garrettsville—J. W. Root.  
Glenmont—L. Vogel.  
Gnadenhutten—J. Wheeland.  
Grand River—J. Purtell.  
Hiram—S. H. Bartlett.  
Kelleys Island—J. Hamilton.  
Kilbuck—W. Gray.  
Le Roy—C. Cleny.  
Mantua—A. W. Russell.  
Martins Ferry—N. Wyckoff.  
Mineral Ridge—E. E. Robinson.  
Morristown—J. Tenant.  
McConnellsville—J. B. McLucas.  
Nelsonville—Dr. Nathan Hill.  
Newburg Heights—C. N. Green.  
New London—J. P. Carr.  
Norwood—W. F. Fridman.  
Portsmouth—F. N. Tynes.  
Ravenna—C. Hubbell.  
Rockport—W. Dahn.  
Sebring—R. J. Lyons.  
Smithville—J. H. Zook.  
Ulrichsville—J. L. Hillyer.  
Washingtonville—G. Ballantyne.  
Washington C. H.—H. B. Smith.  
Waverly—C. Vallery.  
Willoughby—S. S. Wilson.  
Yellow Springs—W. Dodds.

### TENNESSEE.

Memphis—Edw. H. Crump.  
Wartrace—D. F. Finney.

### SOUTH CAROLINA

Charleston—John P. Grace.

### CONNECTICUT

Rockville—Lyman T. Tingier.

### FLORIDA

Lakeland—S. L. A. Clonts.  
Sawtey—G. T. Pearce.  
Keywest—J. N. Fogarty.

### CALIFORNIA

Sacramento—M. R. Beard.  
San Francisco—James Rolph, Jr.

### WASHINGTON

Everett—Rev. B. B. Hassell.  
Vancouver—Chas. S. Irwin.

### WYOMING

Sheridan—Chas. A. Kuttcher.

### NEW HAMPSHIRE

Concord—Jas. J. French.

### WEST VIRGINIA

Bellaire—Wassmann.  
Martins Ferry—Wyckoff.

## MUNICIPAL APPLIANCES

### Locomotive Crane

The Browning Engineering Company, Cleveland, O., manufacture a locomotive crane which on account of its extreme adaptability for different kinds of service is finding a constantly increasing field of usefulness among contractors for municipal work as well as municipal departments. The illustration shows a Browning crane owned by the Board of Water Commission of Detroit, Mich. This crane can be used to handle a hook block, an electric lift magnet, an automatic bucket of any type, a drag scraper bucket, a steam shovel dipper or pile driver hammer and leads. Any and all of these are quickly interchangeable with the others, thus giving the owner an all-round machine, useful anywhere and everywhere.

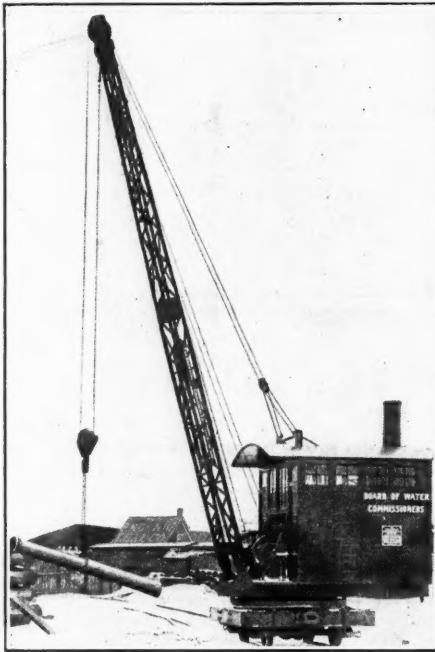
In general the crane consists of a car body, or lower traveling base, mounted on four or eight wheels. The gage is usually made standard, but can be arranged to suit any requirements. The single truck, or four-wheel type, is constructed with the axle boxes bolted directly to the structural frame, but they are arranged to allow some play when going over rough track and around curves. All four wheels are driven by a train of gearing.

Details of construction show skilful and rugged design. All shafting is made of hammered steel, rough turned, then ground to exact size, no turned journals being used. All bearings are bushed with phosphor bronze instead of babbit. The slip ring is a large steel casting having the gear teeth for rotating on one edge and a roller path on its upper side. Although it is held concentric with the center pin it is free to turn around on its seat. The purpose of the slip ring is to increase the speed of operation, by acting as a safety device for the entire mechanism. The slip ring eliminates strains due to careless operation, saving the machinery in case the boom or rear end of the machine should meet an obstruction while swinging. It also allows the rotating clutches to be thrown in when the load is being twisted.

The rotating base is usually a single heavy casting carried by four bronze bushed conical steel rollers. Means are provided whereby the rollers can be easily removed without jacking up the

entire structure or disturbing the balance of the machinery. All clutches with the exception of the boom hoist are of the Browning patent, all steel improved type. They consist of but five principal parts, the grip being accomplished by expanding a square helical steel spring against the inner side of the steel sleeve.

The engines are of the vertical slide valve type, being reversible by means of Stephenson links. The cylinders and cross-head guides are cast and bored in



DETROIT WATER WORKS' CRANE.

one piece, which assures absolute alignment of the cross-heads.

Double drums instead of a single main hoist drum are furnished on a crane when an automatic or drag scraper bucket or grapple is to be handled. The hoisting drum can be used with a hook block for ordinary hoisting when the bucket is detached. The opening and lowering drum receives its power by friction from the hoisting drum, thus eliminating an extra lever.

The boom is made up of angles rigidly connected and traced by the plates and lattice bars. The port end of the boom carries brackets for pin connections to the rotating base. All levers and controls are arranged vertically in a convenient manner in front of the operator so as to give him an unobstructed view.

### Asphalt Blocks

Asphalt blocks have been manufactured for paving purposes since 1869. Since that time, however, several important improvements have been made in the process of manufacture which makes the blocks of quite a different material from what they were then. At first in San Francisco, where they were first made, the blocks were pressed by hand. In 1880 a powerful mechanical press was made, which on account of the improved quality of the product and the capacity afforded, at once put the asphalt block business on a firm footing. Up to 1893 limestone had been used as the aggregate of the bituminous concrete of which the blocks were made. At this date crushed trap was substituted for the

limestone, which gave the block pavement much greater durability under heavy traffic.

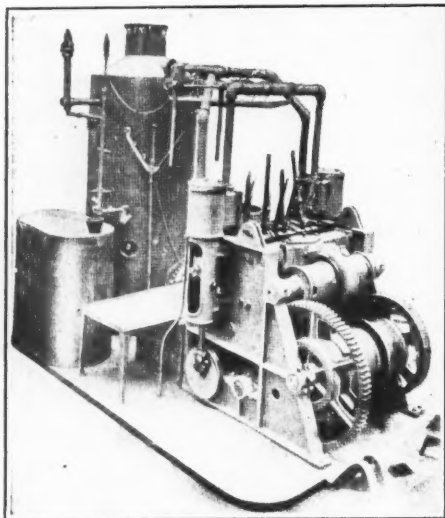
No revolutionary improvement in the process has been made since this date, though a number of minor improvements have been introduced, such as mechanical improvements in the presses and steam heating of the asphalt, which, just developed in connection with this industry, has since become the standard method of heating and refining asphalt for all paving purposes.

The manufacturing process is substantially as follows: The crude asphalt is refined, combined with the necessary flux to make the asphaltic cement, which is mixed with the crushed rock at a temperature of 300 degrees. At this temperature the material goes to the press, where each block is subjected to a pressure of 200 tons. From the press the blocks are carried by a conveyor though a water bath, where they are gradually cooled. Then they are ready for shipment.

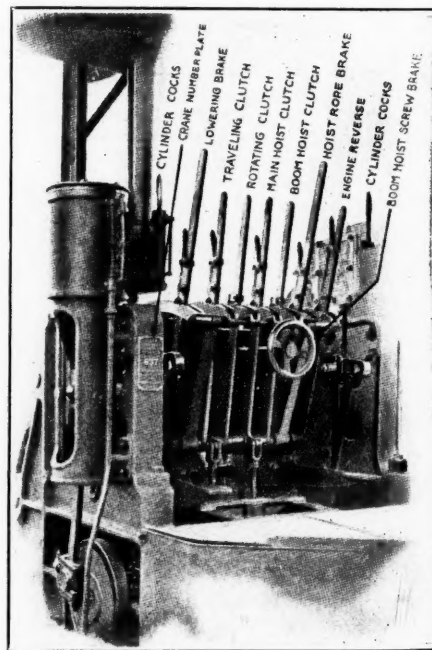
The Hastings Pavement Co., 25 Broad street, New York, the leading company in the business, manufactures the blocks in a variety of sizes in order to meet the demand for special kinds of pavement adapted to the different sorts of streets. The Hastings Co. uses Trinidad Lake asphalt exclusively because it has stood the test of 20 years and because the supply is practically inexhaustible and uniform. The blocks are made 5x12x3 inches, weighing 16 pounds each, and 5x12x2 inches, weighing 11 pounds each. The specific gravity of the asphalt block mixture is 2.5, as compared with 2.25, the weight of a sheet asphalt mixture.

The merits claimed for the material are that it is: Non-slippery; noiseless; sanitary; durable; pleasing in appearance; easily and cheaply repaired; smooth surface; homogeneous structure; not injuriously affected by extremes in temperature; reasonableness in cost.

At the present time, when the question of the paving of highways is a matter of unusual interest, the adaptability of asphalt blocks to this purpose should be considered. For this purpose the block 2 inches thick is used. The pavement can be laid over an old pavement, grade

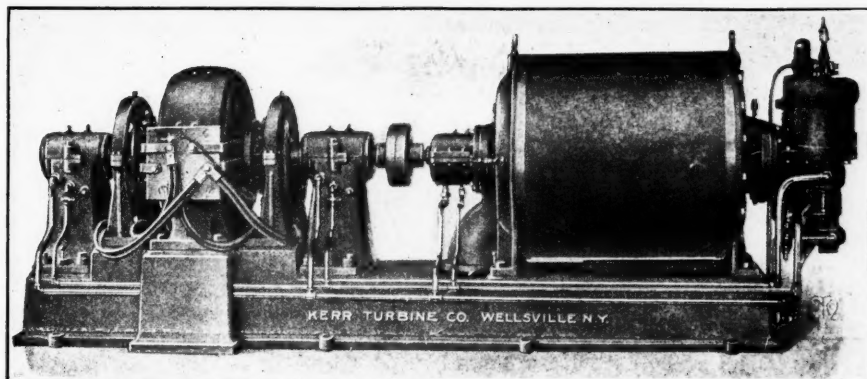


VIEW OF MACHINERY OF CRANE.



OPERATING LEVERS OF CRANE.





MODERATE SIZED STEAM TURBINE AND ELECTRIC GENERATOR.

permitting, of macadam, stone, or, in fact, any material, as well as over a new gravel bed, the only requirement being the mortar bed about 1 inch thick on a sand cushion  $1\frac{1}{2}$  inch thick.

An advantage of this material for road work well worth considering is the fact that the width of the roadway can be extended at any time without waste of material. It has frequently been found in the case of country roads that traffic over a paved road increases so rapidly that the original width, at first sufficient, is not wide enough. In this case strips of new blocks can be laid alongside the first pavement. In road construction it is not necessary to set curbstones or

cent. The speed variation was not enough to cause visible flicker of the lamps. A turbo-generator set, as compared with engine driven, is claimed to cost less for apparatus, installation, foundation, attendance, repairs and supplies, besides being more compact and occupying less floor space.

Turbo-pumping units made by the same company are suitable for water supply and fire service. The purely rotary motion does away with noise and with the jar that racks a reciprocating pump and its pipe lines, and at the same time gives a practically constant discharge pressure when the pump is operated at constant speed.



heading stones to border or define the paved area, since a row of stretcher blocks held firmly in place by a shoulder of mortar answers the purpose.

#### Small Turbo-Generator for Lighting Current

The Kerr Turbine Co., Wellsville, N. Y., manufacture turbo-generators suitable for use for generating electric current for public buildings where a steam plant has already been installed, as well as for isolated plants. The sets are made in a number of sizes up to 500 k.w. alternating and 350 k.w. direct current. The operation is claimed to be economical throughout a wide range of initial steam pressures, the steam economy is improved by superheat, and any exhaust conditions are permissible. It is stated that when operating non-condensing, the steam consumption compares favorably with that of a high speed engine of the same capacity, while in condensing plants the economy at full loads equals that of the best compound engine, and at fractional loads is much better. It is claimed that the good economy of a new turbine is maintained indefinitely, as the absence of internal wearing parts and special adjustments keeps the initial conditions unchanged. The constant torque on the rotor is specially beneficial in generator driving, and the oil relay type of governor makes the turbine speed practically immune from variation on account of load changes. For instance, it is stated, one of the 125 k.w. outfits showed a speed variation of less than 1.7 per cent. between full load and no load and from 80 k.w. to no load 0.83 per cent. At 156 k.w. sudden drop to normal momentarily increased the speed only 3.06 per

#### The Gradiograph

A. G. Thornton, Ltd., Manchester, England, make an instrument which is designed for railroad construction, sewerage, road making, etc., and is equally adapted for any purpose where it is necessary to work to a given gradient or to ascertain the correct inclination of any existing gradient.

The accompanying illustration shows the essential features of the apparatus. Its overall measurements are 36 inches, and the total weight ready for use is 7 pounds. It consists of an elongated metal casing of rectangular section made of

nickel aluminum, a white non-corrosive metal which combines extreme lightness with great durability. The casing inside is very accurately machined and adjusted, so special tools have been designed to facilitate this operation. An accurately graduated steelyard is pivoted toward one end of the casing at a point that coincides with zero, and is marked in units and half units, from 30 to 305; above the pivot, and attached to the steelyard is mounted a sensitive bubble. This bubble is graduated and accurately ground, being the same as we put in all civil engineering instruments such as levels, theodolites, etc.

Traveling along the steelyard is a cursor or traveler so graduated to make it possible of adjustment to any intermediate gradient such as 1 in 98.7 or 1 in 296.8, this cursor is made of gun metal with hardened steel runner inserted. At the extreme end of the steelyard is provided a notch or recess, and when the cursor is placed in this position the Gradiograph is converted into a very accurate level.

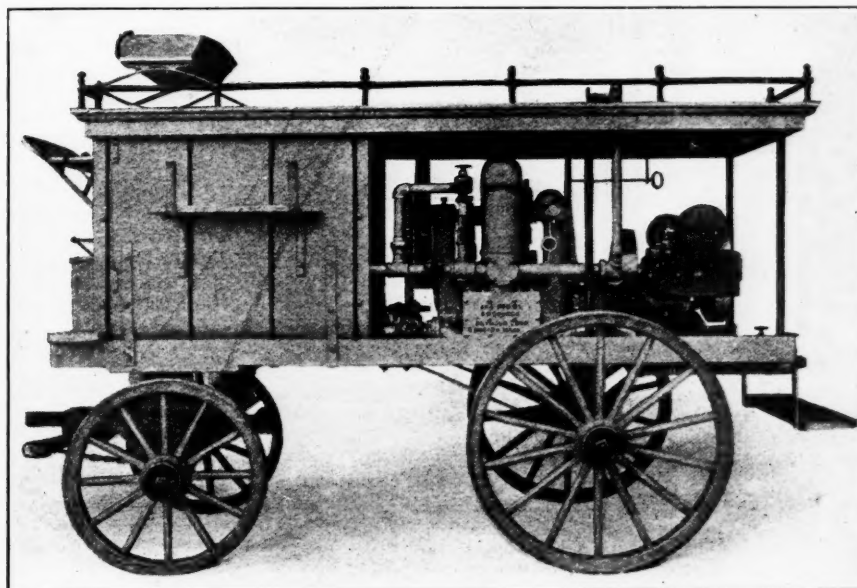
As before-mentioned, the Gradiograph here described has a range of gradients from 1 to 30 to 1 in 305; but, if desired, the graduations on the steelyard can be arranged to give different gradients.

The apparatus is used on the invert of the pipe, and not on the outside surface, and is especially adapted for use where pipes are laid in a heading. Where a sewer or drain is laid by its use every individual pipe should have exactly the same fall, and therefore with the slightest gradient a perfectly self-cleansing bore is obtained.

The Gradiograph can be used for the laying of any length of pipes. It is provided with case hardened steel feet for laying pipes 2 feet and 2 feet 6 inches long, but if longer pipes are being used it can readily be attached by means of the lugs at either end of the instrument to any length of a straight edge, and by the same means the cutting can be excavated to the exact gradient required for the pipes.

#### High Pressure Power Sprayer

S. B. Church, 66 High street, Boston, Mass., and Seymour, Conn., is the originator of high pressure power sprayers which have been so successful in clearing the trees of insect pests. The outfit, which consists of a wagon frame with



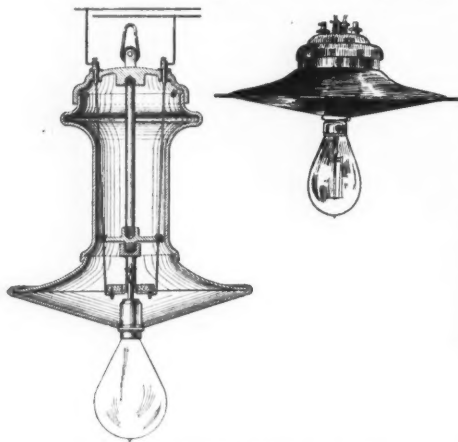
HIGH PRESSURE POWER SPRAYER USED IN NEW ENGLAND CITIES.

forward wheels, which cut under the body, consist of a mixing tank for the chemical, a gasoline engine and a duplex piston pump. The tank has a capacity of 400 gallons. The engine is capable of maintaining a pressure of 200 pounds and a stream can be thrown from ground to top of the highest trees.

#### Fixture for Tungsten Street Lights

F. P. Harrison, Covington, Ga., has placed on the market an electric light fixture for tungsten street lights. The feature of the fixture is claimed to be an improved means for suspending and protecting the light. The hanger proper is suspended from and inclosed by a shield to the lower portion of which a lamp socket and reflector are attached. The device provides a means for hanging and supporting a lamp fixture and for holding the conducting wires duly separated and yet protected from contact with the hand line used for lowering or elevating the lamp.

A sheet metal protector is suspended



NEW TUNGSTEN LIGHT FIXTURE.

from a cup or cover and encloses other parts, as shown in the illustration. On the inner side of this convex cover is a central box into which a rod is screwed. This rod is connected by a screw joint with a disk made of heavy metal, tending to maintain the fixture in a vertical position. This heavy disk is provided with a screwtop to which a lamp holder is attached, the same being connected with a hood of non-conducting material, to which conducting wires are attached. A socket is provided into which an incandescent bulb is screwed. The conducting wires are secured in binding-posts attached to the underside of the disk, and spring contacts are also connected to the same binding posts, and when the lamp socket is attached the springs are in contact therewith, and thus a circuit is closed through the wires and the ordinary conductors extending to a source of electrical supply. Then wires pass through insulated plugs fixed in the metal plate and are attached to binding screws which are attached to and insulated from the conical top of the shield. Short wires operatively connect the binding-screws with the line conductors.

Mr. Harrison states that 60 of his lamps use the same amount of electricity as is required for 25 arc lamps, and yet furnish the same candlepower each.

#### A New Design of Controllable Concrete Dump Bucket

The Ransome Concrete Machinery Co., Dunellen, N. J., has just put on the market a new design of concrete dump bucket that is especially adapted for placing concrete in thin walls, even as thin as 3

inches, without waste or extra handling, while at the same time it is a generally useful bucket and has ample volume.

The section of the bucket is a right-angle triangle, with the vertical or front side free from all mechanism. The dumping devices are located on the hypotenuse, and thus the operation of the bucket is easily effected without interference from projecting steel reinforcement rods or forms. In operation the vertical side is brought up against the steel work.

The dumping device is exceedingly simple, and readily controlled by a handle operating a cam that bears on an equal arm lever that connects by another lever to the drop bottom. The operator has ready control over the amount of concrete to be placed, and by moving the bucket forwards and backwards can place concrete in thin layers as desired. It will be noticed that this bucket can be placed directly against vertical steel rods throwing the contents of the bucket between them. The shape of the drop bottom is such that with a little experience the operator can cast the concrete through a steel system from 4 to 6 feet wide.

The straight side gives a clear fall by gravity to the concrete, which produces a scouring on the sloping side and completely clears the bucket, thus reducing to a minimum the time for ordinary cleaning operation. When desired, the bucket is furnished with legs so that it can be set down in an upright position. The bucket is fully patented.

It has been used with much success by contractors J. B. Smith & Co. in erecting the inclined reinforced concrete abutments for the overhead double track crossing on the Western and Atlantic Railway at McCarty, Tenn.

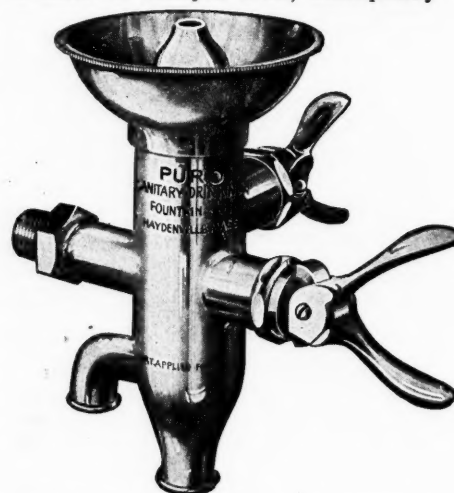
#### Puro Sanitary Drinking Fountain.

The Puro Sanitary Drinking Fountain Co., Haydenville, Man., have placed on the market a sanitary drinking fountain which is said to be the only device which in the fullest way replaces the old style faucet, and in addition thereto allows of a cleanly natural and easy way of drinking from a bubble. The hand-drinking cups are so well known as breeders of disease, no special mention of this phase of the subject is necessary.

The Puro aside from its sanitary drinking features and faucet combination appeals strongly to the economical business instinct of prospective buyers, as it is not an expense but actually an investment, as Puro will, in but a short time, repay for itself. This is based on the fact that all of 35 per cent. of the water usually wasted through faucet is saved by the method of bubble, besides both handles being self-closing, the water runs only so long as the hand grasps the handles. The usual method of drinking by cup from faucet is extremely wasteful, not alone in the amount of water wasted, but as well in the time expended by the man in going through the forms of rinsing out cups then resting up against the sink and gazing around, while drinking. The drinker's time is saved materially, as in drinking from Puro he is compelled to stoop over, and he is intent only on the one thing that he is doing—drinking.

Another appealing feature of

Puro is that it is a finely made article, a solid brass casting, not a single part of it is made of stamped brass, consequently

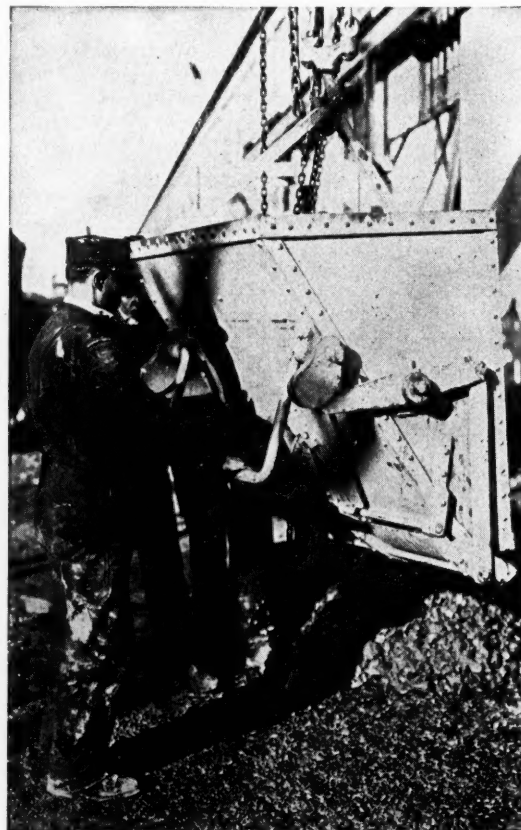


nothing to get out of order, no expensive installation charges. The Puro is screwed on in place of the old faucet.

The majority of fountains on the market emit a stream of water the size of a lead pencil; this is not a proper nor pleasant method of drinking, as it is neither comfortable nor adequate; the average drinking fountain is erratic in its supply, the user never knowing when he will receive the disagreeable surprise of a shower bath, or a stronger stream of water than desired.

Puro is claimed to positively obviate the above objectionable features—the bubble rises to a height of about 1½ inches (regulated to height desired, then gracefully breaks, its appearance is like a geyser—the control is absolute and cannot rise higher than it is set for.

The life of Puro is claimed to be unlimited, there being nothing to wear or get out of order, consequently no constant repair charges.



NEW RANSOME CONCRETE BUCKET.



# INDUSTRIAL NEWS

**Cast Iron Pipe.**—Chicago: In the West and Pacific coast territory considerable business is in sight. Current lettings, however, have been small. Quotations: 4-inch, \$26.50; 6 to 12-inch, \$24.50; 16-inch and up, \$24. Birmingham: The large letting to take place in Portland, Ore., Dec. 12, has strengthened the market. The active capacity of plants in this vicinity is taken care of until February. Orders for certain sizes have recently been declined, and the aggregate accumulation of all sizes on local yards is considerably less than one year ago. Quotations are unchanged, and it is believed that prices are not being shaded. Quotations: 4 to 6-inch, 23; 8 to 12-inch, \$22; 12-inch and over 21; special fittings are quoted at \$45 to \$50 per net ton at foundry. New York: Large inquiries are said to be pending. Numerous important buyers are in the market for delivery next spring. Quotations: 6-inch, car loads, \$22 to \$23.

**Lead.**—The price was advanced 10c. per 100 lbs. by the A. S. & M. Co., November 27, making the New York price 4.45c., and the St. Louis price 4.35c. The outside price is 4.50c. The market is firm and active.

**Automatic Gas Lighter.**—As a result of tests conducted in actual service with 230 automatic gas lighters of a new form of construction, the lighting board of Gothenburg has recommended to the city council the installation of 1,000 of these devices for street gas lamps at a cost of \$5,360. This device, inserted between the main connection and the incandescent mantle lamp, is controlled from the central station and is operated by varying the pressure in the mains. By its use the employment of men to go about and light the lamps is obviated. Every lamp, every other lamp, or every third lamp on a main may be lighted at the same time, or the order may be varied as desired. Where two or more lamps are mounted on a single lamp-post, one can be extinguished or lighted at a time. The economy of gas is claimed to be considerable, in addition to the saving of labor. The device is manufactured in Sweden.

**Sand and Gravel.**—Some twenty-four dealers in sand and gravel have issued a circular letter addressed to other dealers in the trade inviting them to meet at the Auditorium Hotel, Chicago, Ill., December 15-16, for the purpose of forming a permanent national organization. The meeting is to be preliminary in its nature and plans and methods will be discussed for the formation of an organization and the preparation of a constitution and by-laws. Later, particularly to accommodate the producers near New York, another meeting will be held, at the Hotel Astor, New York, January 31.

**Concrete Machinery.**—The Iowa Foundry & Manufacturing Company, of Fort Dodge, Ia., has announced the consolidation with itself of the Universal Concrete Machinery Co., of Waterloo, Ia. The line of concrete machinery will be enlarged, and all parts of the machinery will be manufactured in the company's shops. The Elk gasoline engine will also be built; this is equipped with the Ballard governor, a new device which is reported to be remarkably efficient.

**Steam Shovels.**—The Marion Shovel & Dredge Company of Marion, Ohio, has purchased the entire business, including patents, designs, patterns and good-will of the Osgood Dredge Company, of Albany, N. Y., and the two companies have been consolidated under the name of the Marion-Osgood Company.

**Sand Dryers.**—The Ruggles-Coles Engineering Company has recently received from the Amies Road Company an order for three small Class "F" Ruggles-Coles for sand, used by the companies operating under the Amies Road Company's patents.

**Chemical Engine Test.**—The Kana-wha Chemical Engine Company recently made a test of its engine before the fire department authorities of New York City. The demonstration was in charge of W. P. Cochran and he had with him two different types of engines; one was the 50-gallon, 30-hp. truck, carrying 200 ft. of chemical hose and 2,000 ft. of two and a half-inch fire hose; the other was a 35-gallon chemical truck, carrying 200 ft. of chemical hose and four men.

**Asphalt Blocks.**—The Barber Asphalt Paving Company is laying a sample of asphalt block pavement on Franklin street, Tampa, Fla. R. L. Davis is representing the Barber company. City Engineer Warren is supervising the work, though it is being done without any obligation on the part of the city.

**Cement Plant.**—The Standard Portland Cement Company, Charleston, S. C., has announced that it will double the capacity of its plant at Leeds, Ala., and will install a steam turbine plant. F. H. Lewis, Birmingham, is the engineer in charge.

**Lamps.**—The Prest-O-Lite Company, Indianapolis, Ind., has begun work on its branch plant in St. Louis, and will soon be in condition to consider the equipment of the factory.

**Steel Tanks.**—The Standard Steel Tank Company, Girard, Ohio, formerly the Ohio Boiler Company, has commenced the erection of an addition that will double its present capacity.

**Paving Material.**—The Roc-Mac Company, F. H. Keefer, president, Port Arthur, Ont., manufacturer of paving materials and liquid binders, will build a plant at that place, comprised of a crushing mill, a hydrated lime mill, a chemical and analytical laboratory, a cooperage shop and office building, to cost \$40,000. The company has established a branch plant at North Tonawanda, N. Y.

**Gravel Plant.**—The National Sand & Development Company, Peekskill, N. Y., is receiving bids for the installation of an excavating, crushing, screening and washing plant for handling sand and gravel, to have a capacity of 1,000 cubic yards per day. Geo. H. Rice, secretary, Peekskill.

**Road Machine.**—The Glide Road Machine Company, Minneapolis, Minn., has had plans prepared for a two-story factory building 76 x 90 ft., of brick construction, at an approximate cost of \$6,000.

**Steel Furniture.**—The Art Metal Construction Company, W. H. Atwood, New England, manager, Boston, Mass., are installing metal furniture in the new municipal building, New Bedford, Mass. Part of the furniture is of standard

style and design and part of it, wall cases and the like, are made by measure to fit the space.

**New Process Concrete.**—Herr Aman-dus Volker, mechanical and construction engineer of Dresden, Germany, arrived recently in Los Angeles for the purpose of installing the first plant in the United States for the manufacture of a special form of machine-made concrete poles and piling.

Lathe-turned concrete pilings have been in use successfully in municipal and engineering projects in Germany, Austria and Italy, and have come to Los Angeles, where a constantly growing market for concrete materials exists. Concrete, under this new patent, is poured into forms which lie within a long turning lathe, the lathe being then revolved by electricity at the rate of 600 revolutions per minute. Within ten minutes the concrete has set to a point where it will hold its form, and it is then placed in storage to harden for two or three weeks, after which it is ready for the market. The concrete is always heavily reinforced, the reinforcement being placed in the lathe in such a manner as not to adhere to the walls of the molds. As a result of this process, a cylinder of reinforced concrete of any desired length can be made, the concrete being more thoroughly mixed and having greater elasticity than any other material.

"The new Leipsic depot is being built with this kind of concrete," said Herr Volker yesterday. "The biggest contractors in Germany are taking it up. Of course the process cannot be used in mass construction, but for columns, sewers, telegraph poles, conduits, and any sort of cylindrical form of concrete it is proving a great success. It should be especially good for harbor piling, as it is strong and can be driven further without injury than the ordinary concrete piles."

Louis Blankenhorn is president of the Los Angeles company operating under this process.

## NEW CORPORATIONS

The Mogul Motor Truck Co., Chicago, Ill.; capital, \$125,000. Incorporators: George C. Griffith, L. S. James, Frank Dawson and John F. Hicks.

The Illinois Culvert Co., Springfield, Ill.; capital, \$12,000. Incorporators: L. R. Craig, A. E. Heyworth and Fred L. Vermillion.

The Solar Inverted Arc Lamp Co., Chicago, Ill.; capital, \$10,000. Incorporators: David Broutman, Isadore S. Krinsky and Samuel Solomon.

The Metal Flanged Concrete Pipe Co., at Mt. Gilead, O.; capital, \$15,000. Incorporators: S. C. Roettinger, W. L. Paxson and others.

The Simpson Tire Fibre Co., Detroit, Mich.; capital, \$100,000. Incorporators: S. L. Simpson, James D. May and Harry J. Dingemann, all of Detroit.

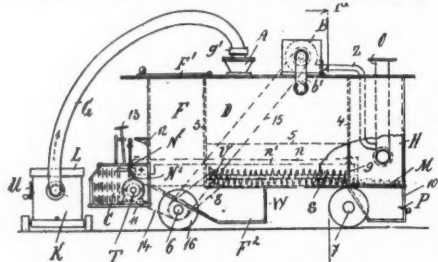
The St. Clair Water Co.; capital, \$100,000. Incorporators: J. D. Houseman, of St. Louis, Mo.; J. F. McGowan, of East St. Louis, and John B. Downman and P. W. Page, of St. Louis; to supply water to East St. Louis upon the expiration early in the coming year of the 50-year franchise now being held by the City Water Co., of East St. Louis.

Giles Construction Co., Brooklyn, N. Y.; general contracting; capital, \$50,000. Incorporators: Stephen W. Giles, John C. Giles, Jr., both of No. 1917 Newkirk avenue; Christian E. Kern, No. 2504 Clarendon Road, Brooklyn.

## PATENT CLAIMS

**1,009,914. GARBAGE CARTING AND DESTRUCTING DEVICE.** Gustav Mayer-Dinkel, Mannheim, Germany. Serial No. 626,139.

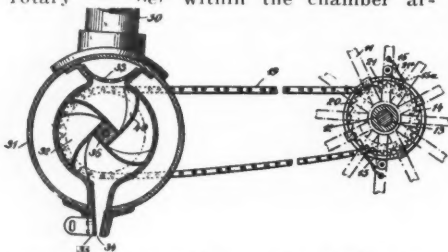
In a garbage carting and destructing device, the combination with a cart comprising a storage chamber with hopper and a furnace, of a portable garbage receptacle, means for connecting said portable receptacle with the storage chamber of said cart, an electromotor on said cart, a storage battery on said cart, an electric burner in said furnace, means for passing at will a current from said



battery through said electric burner and said electromotor simultaneously or separately, a conveyer in said hopper adapted to suck in air through said portable receptacle for carrying away the garbage with the current of air into the storage chamber, and to discharge the air separated into the furnace for producing a draft, a conveyer in said hopper adapted to feed the garbage to said furnace, and means for transmitting at will the motion from said electromotor to said exhaustor, said conveyer and the wheels of said cart simultaneously or severally.

**1,009,805. ASPHALT DISTRIBUTER.** William F. Tarrant, Saratoga Springs, N. Y. Serial No. 554,109.

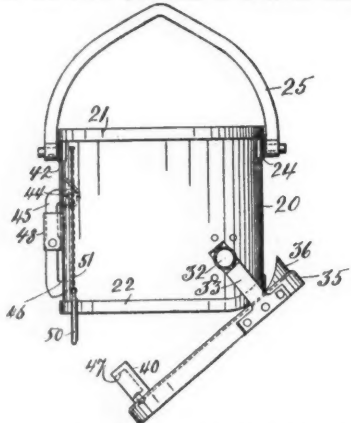
A vehicle, an asphalt distributor connected therewith, said distributor comprising a nozzle, a chamber connected with said nozzle through which the asphalt flows by gravity to the nozzle, a rotary member within the chamber ar-



ranged to stop said flow of asphalt when at rest and to control the rate of flow thereof when rotated, a heater surrounding the chamber and said rotary member, and means for driving said rotary member at a rate proportional to that of the movement of the vehicle.

**1,010,325. BOTTOM-DUMPING BUCKET.** Et. Gustavus L. Stuebner, Flushing, N. Y. Serial No. 421,834.

In a bucket the combination of a body, the lower edge of said body being curved up at its rear portion, a bottom hinged



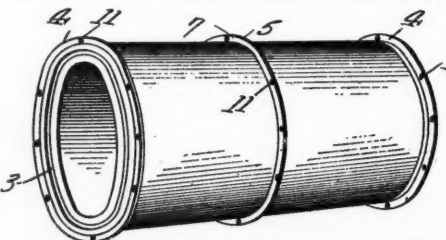
to the sides of the bucket between the front and rear thereof, a filling block on said bottom, and means to lock the bottom to the body of the bucket.

**1,010,209. CONSTRUCTION OR PREPARATION OF ROAD-SURFACES AND PAVEMENTS.** Karl Ludwig Valentin Zimmer, Hamburg, Germany. Serial No. 557,277.

The process for forming road surfaces and pavements by means of stony particles and a water-repellent binding substance, which consists in treating the stony particles with a solution or emulsion of the said binding substance to form a coating, subsequently precipitable receptacle with the storage chemical treatment, to form a coherent deposit, and finally finishing the road surface mechanically in the usual manner, substantially as described.

**1,009,840. REINFORCED METAL-FLANGED CONCRETE PIPE.** Joseph Hickson, Mount Gilead, O. Serial No. 629,737.

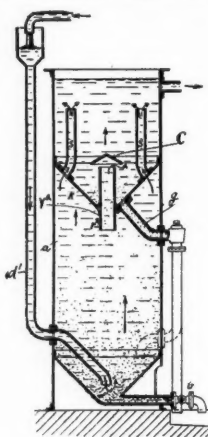
A device of the class described comprising a body, bands surrounding the body at spaced points, each band consisting of a central portion, the outer face of which is flush with the outer face of the body, a flange extending from one edge of said central portion, and spaced lugs extended into the body from the other edge of said central portion; and reinforcing elements mounted in the lugs and extended longitudinally of the body,



the reinforcing elements being located nearer to the outer face of the body than to the flow-line of the body; the band being fashioned from a single strip of material of equal thickness throughout.

**1,009,857. WATER-PURIFYING APPARATUS.** Hans Reiser, Cologne, Germany. Serial No. 613,393.

Settling apparatus comprising a chamber and means for causing the water to flow upward therein, and exits leading from the chamber, part thereof at a relatively lower level and centrally of the chamber and part at a relatively higher level and at the outer parts of the cham-



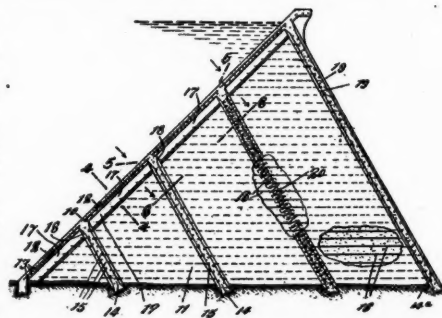
ber, said exits having a combined cross-section materially less than the chamber, whereby a zone of materially lowered velocity is afforded in the said chamber between the levels of the exits, and an upper settling chamber into the central part of which the lower exits open.

**1,010,400. FLUID-METER.** Edgar P. Coleman, Buffalo, N. Y.; Robert H. Coleman, administrator of said Edgar P. Coleman, deceased. Serial No. 506,023.

A proportional fluid meter comprising a main conduit provided with a nozzle having a converging orifice, a by-pass around the converging orifice of the conduit, provided with a jet nozzle having a converging orifice, said converging orifices affording a substantially proportional flow of fluid through the main conduit and by-pass, and a motor embracing a rotor operated by the impact due to the velocity of the fluid issuing from said jet nozzle under the pressure head due to the converging orifice in the conduit.

**1,010,131. DAM CONSTRUCTION.** Walter S. Edge, New York, N. Y. Serial No. 609,236.

A dam embodying a deck supported by buttresses which extend across the



stream, the walls of which are inclined at an angle to the vertical, substantially as set forth.

**1,010,220. AUXILIARY VALVE FOR WATER PIPES, &c.** George A. Blake, Boston, Mass. Serial No. 593,693.

In a liquid distributing system, the combination with a supply pipe and a valve controlled service pipe having an inner shoulder and a lateral opening; of an apertured valve casing of greater diameter than the lateral opening of the service pipe and wholly arranged in the service pipe at a point between the valve thereof and the supply pipe and bearing on the shoulder, an apertured valve plug located in the casing, and an operating handle connected to the plug and extending through said lateral opening.

**1,010,210. DISINFECTANT.** Karl Ludwig Valentin Zimmer, Hamburg, Germany. Serial No. 567,693.

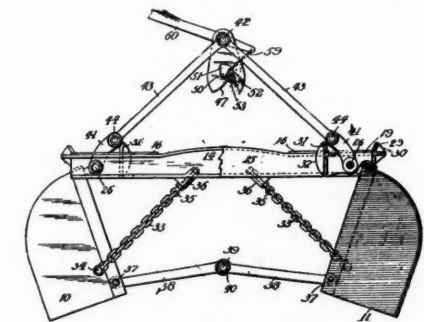
The process for the manufacture of a permanent disinfectant containing formaldehyde and capable of readily emulsifying mineral oils, tar, tar oils and resin oils, which comprises mixing sulfo acid obtained from vegetable oil by means of sulfuric acid, with a caseinate solution and introducing formaldehyde into the mixture thus obtained, substantially as described.

**1,009,098. NOZZLE FOR STREET WASHING AND SPRINKLING MACHINES.** William Ratican, St. Louis, Mo., assignor to St. Louis Street Flushing Machine Co., St. Louis, Mo., a Corporation of Missouri. Serial No. 604,624.

A traveling street washing and sprinkling apparatus comprising a water tank having a down-turned supply pipe and a delivery pipe, valves in said pipes, a strainer in said supply pipe close to and above the open end thereof, the free passage through the strainer being of not greater width than the narrowest width of the passage through the valves or delivery pipe.

**1,010,331. GRAB - BUCKET.** Alfred Walcher, St. Louis, Mo., and Harold M. Flaisted, Granite City, Ill. Serial No. 510,519.

In a device of the character described, the combination of a frame, a pair of buckets pivoted thereto, means for limiting the opening movement of said buckets, a link unconnected with the frame a bucket operating device, links pivotally



connecting the free ends of said links, a bucket operating device, links pivotally connecting said device with said frame, and means for guiding said links in their pivotal movement on the frame, substantially as described.



## THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards.

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

### BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK.	ADDRESS INQUIRIES TO
<b>STREET IMPROVEMENTS</b>				
Ohio.....	Cincinnati.....	Dec. 8.....	Constr. tar macadam pavem't with combined curb and gutter	J. J. Wenner, Clk. Bd. Pub. Serv.
Louisiana.....	New Orleans.....	Dec. 11, noon.....	Constructing 9½ miles of highway.....	Dept. Board State Engineers.
Kentucky.....	Louisville.....	Dec. 11, 2 p.m.....	Improv. a number of streets with granite and vitrified block	R. G. McGrath, Sec'y Bd. Pub. Wks.
New Jersey.....	Beach Haven.....	Dec. 11, 8.30 p.m.....	Grading and graveling street.....	S. S. Andrews, Boro. Clerk.
Missouri.....	Carthage.....	Dec. 11, 7.30 p.m.....	Constr. 7,000 sq. yds. asphalted concrete pavement.....	F. B. Newton, City Engr.
Indiana.....	Vanderburgh.....	Dec. 14, 10 a.m.....	Furnishing broken stone and gravel.....	Turnpike Directors.
Indiana.....	Evansville.....	Dec. 14, 10 a.m.....	Repairing turnpike with rock and gravel.....	C. B. Beard, Clerk.
Canada.....	Edmonton, Alta.....	Dec. 15.....	Constr. 100,000 sq. yds. grading and paving with curb.....	City Comm.
Washington.....	Olympia.....	Dec. 16, 5 p.m.....	Constructing concrete sidewalk.....	I. N. Holmes, City Clerk.
Kansas.....	Kansas City.....	Dec. 18.....	Laying 1½ miles of macadam.....	County Commissioners.
Alabama.....	Hamilton.....	Dec. 21.....	Constructing 13½ miles gravel road.....	County Commissioners.
Florida.....	Jacksonville.....	Dec. 20, 10 a.m.....	Constructing road of brick or asphalt macadam.....	G. L. Barnard, County Engineer.
Ohio.....	Cincinnati.....	Dec. 22, noon.....	Resurfacing and repairing Forest avenue.....	Stanley Strubel, Pres. Co. Commiss.
Ohio.....	Pleasant Ridge.....	Dec. 23, noon.....	Macadamizing and constructing cement curb and gutter.....	H. B. Hayden, Village Clk.
Nebraska.....	Lincoln.....	Dec. 27, 2 p.m.....	Paving portion of O street.....	H. F. Wells, County Clk.
Minnesota.....	Winona.....	Jan. 10.....	Constructing 20 miles macadam roads.....	J. Winczewski, County Auditor.
Indiana.....	Laporte.....	Jan. 11, 1912.....	Constructing asphalt concrete pavement on Pine Lake Ave.....	W. Krueger, Clerk.
Illinois.....	Rockville.....	Feb. 1.....	Constructing 30,000 sq. yds. brick pavement.....	City Clerk & Aetna Engineering Bureau, Chicago.
<b>SEWERAGE</b>				
Illinois.....	Chicago.....	Dec. 8, 2 p.m.....	Furnish. sewer pipe, cement, explosives and engrs.' supplies	Bd. of Insp'rs, House of Correction.
Kentucky.....	Louisville.....	Dec. 8, 2 p.m.....	Constructing 10-in. sewer and 22-in. drain.....	Board of Public Works.
New Jersey.....	Trenton.....	Dec. 8, 2.30 p.m.....	Constr. drain in Woodland street.....	H. B. Salter, City Clk.
Indiana.....	Evansville.....	Dec. 9, 10 a.m.....	Constr. 1,360 ft. 18-in. pipe.....	S. A. Bartholome, Bd. Pub. Wks.
Pennsylvania.....	Norristown.....	Dec. 11.....	Constructing sewage disposal plant.....	S. Cameron Corson, Boro. Eng.
Nebraska.....	Falls City.....	Dec. 11, 5 p.m.....	Constructing trunk sewer, cost \$24,000.....	John Wiltse, City Clk.
Nebraska.....	Hastings.....	Dec. 11, 5 p.m.....	Constructing about 4,500 ft. sewer laterals.....	A. T. Bratton, City Clerk.
Ohio.....	Cincinnati.....	Dec. 12 noon.....	Constr. lateral sewers and drains (2 contracts).....	J. J. Wenner, Clk., Dir. Pub. Serv.
Massachusetts.....	New Bedford.....	Dec. 12, 8 p.m.....	Constructing 12,000 linear ft. reinforced concrete sewer 7 ft. x 7 ft. 8 in. with appurtenances.....	W. F. Williams, City Engineer.
Manitoba, Can.....	Neepawa.....	Dec. 15, 8 p.m.....	Constructing sewerage system.....	J. W. Bradley, Secy. and Treas.
Ohio.....	Pleasant Ridge.....	Dec. 16.....	Constructing sanitary sewers and purification works.....	H. B. Hayden, Village Clerk; Riggs & Sherman Co., Toledo.
Washington.....	Tennessis.....	Dec. 18, 8 p.m.....	Constructing 18,550 ft. of 8 to 16-in. sewer.....	B. R. Redman, City Engr.
No. Carolina.....	Edenton.....	Dec. 19, noon.....	Constructing 7 miles 8 to 15 in. sewer pipe and appurtenances.....	R. F. Tuttle, Mayor.
South Carolina.....	Kingstree.....	Dec. 20, 4 p.m.....	Constructing 4 miles of 8 to 12-in. clay pipe sewer and purification plant.....	L. P. Kinder, Mayor; Newton Johnston, Eng., Florence, S. C.
Pennsylvania.....	McKeesport.....	Dec. 27, 7.30.....	Constructing 8 and 15-in. clay pipe sewers.....	S. E. Soles, City Comptroller.
Ohio.....	New Phila.....	Jan. 15.....	Constructing 11.8 miles sanitary sewers and 3 miles storm water sewers, cost \$140,000.....	G. E. Arnold, Engineer.
Missouri.....	Springfield.....	Jan. 15, noon.....	Constructing sewage disposal plant.....	Robt. Lee, Mayor.
Missouri.....	Hannibal.....	Feb. 1.....	Constructing clay pipe and concrete sewers, cost \$30,000.....	W. Y. Use, City Clerk.
Illinois.....	Edwardsville.....	Mar. 1.....	Constructing about 3,000 ft. of 8 to 18-in. pipe sewers.....	C. L. Pitchford.
<b>WATER SUPPLY</b>				
Pennsylvania.....	Aspinwall.....	Dec. 8, 7.30 p.m.....	Furnishing lead, jete packing, 6 gate valves.....	S. R. Chase, Boro. Clk.
Delaware.....	Wilmington.....	Dec. 11, 10.30 a.m.....	Install vertical triplex single acting power pumps, 2 units, of 2 and 4 M. G., respectively; also water turbine, 80 and 40 M. G. capacity.....	Bd. of Water Comm.
Illinois.....	Tremont.....	Dec. 11, 2 p.m.....	Constructing 14,500 ft. 4 to 8-in. c. i. water pipe.....	C. S. Stegner, Pres. Bd. Local Imp.
Nebraska.....	Falls City.....	Dec. 11, 5 p.m.....	Constructing 14,000 ft. 4-in. water main.....	John Wiltse, City Clk.
Oregon.....	Portland.....	Dec. 12 4 p.m.....	Furnishing 12,000 tons C. I. pipe, 500 tons specials.....	Water Board.
Illinois.....	Chicago.....	Dec. 12, 11 a.m.....	Furnishing and directing one 42-ft. 100-ton track scale.....	L. E. McGann, Comm. Pub. Wks.
Iowa.....	Mason City.....	Dec. 12, 8 p.m.....	Furnishing 3,000,000 gal. pump, including condensers.....	J. H. McEwen, City Clerk.
Washington.....	Wapato.....	Dec. 13 8 p.m.....	Constructing pumping plant.....	H. E. Trimble, Town Clerk.
Arizona.....	Scottsdale.....	Dec. 14.....	Constr. water and sewer system for Indian school.....	Comm. Indian Affairs, Washington.
Canada.....	Victoria, B. C.....	Dec. 15.....	Const. water system, cost \$1,500,000, capacity, 16,000,000 gal.	City Clk., Wynn Meredith, Eng.
California.....	San Francisco.....	Dec. 15, 11 a.m.....	Constructing 2 filters at Presidio.....	Lieut.-Col. George McK. Williamson, Deputy Q. M. G.
Oklahoma.....	Bennington.....	Dec. 15, 8 p.m.....	Constructing about 12,000 ft. c. i. water pipe, also pumping station tank and tower.....	Jesse Sipes, Town Clerk.
Manitoba, Can.....	Neepawa.....	Dec. 15.....	Constructing water works.....	J. W. Bradley, Secy. and Treas.
Louisiana.....	Loreauville.....	Dec. 15.....	Constructing water works (Postponed from Nov. 15).....	Board Aldermen.
Canada.....	Quebec.....	Dec. 20.....	Constructing 40 and 44-in. c. i. pipe, special valves, etc.; alternative, steel pipe.....	City Clerk.
Colorado.....	Fort Logan.....	Dec. 20, 10.10 a.m.....	Constructing water distributing system.....	Capt. T. T. Frissell, Constr'g Q. M.
South Carolina.....	Kingstree.....	Dec. 20, 4 p.m.....	Constr. 4 miles C. I. pipe, specials, hydrants, valves, etc.; pumping station, reservoir, tanks and wells.....	LeRoy Lee, Chm. Bd. Pub. Wks.; Newton Johnston, Eng., Florence.
Canada.....	Vancouver, B. C.....	Dec. 27.....	Constr. 24,000 ft. 24-in. steel pipe.....	W. W. McQueen, City Clk.; Herman & Burwell, Engrs.
Ohio.....	Fuclid.....	Jan. 8, noon.....	Constructing 6-in. water main.....	F. H. Shoaff, Village Clk.
Australia.....	Brisbane, Qld.....	Jan. 30, noon.....	Furnishing a 6-million gallon pumping plant of 2 or 3 units	G. E. Johnston, Secy. Board, Albert St., Brisbane, Queensland.

## BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>LIGHTING AND POWER</b>				
Illinois.....	Chicago.....	Dec. 11, 11 a.m.....	Furnishing 100-h.p. boiler.....	L. E. McGann, Comm. Pub. Wks.
Kansas.....	Kansas City.....	Dec. 12 10 a.m.....	Furnishing material for distribution system of electric plant.....	J. E. Porter, Mayor.
Washington.....	Seattle.....	Dec. 12, 10 a.m.....	Furnishing 7,500-volt motor and 500-kw. generator.....	C. B. Bagley, Sec'y Br. Pub. Wks.
Florida.....	Fernandina.....	Dec. 13, noon.....	Furnishing 2 100-hp. boilers.....	G. L. Baltzell.
Ohio.....	Cleveland.....	Dec. 14, noon.....	For furnishing, lighting, extinguishing and maintaining street gas lamps; also furnishing, lighting, extinguishing and maintaining electric lighting.....	A. B. Lea.
Iowa.....	Galva.....	Dec. 15.....	Install electric light system.....	I. E. Paumgardner, Town Clk.
Virginia.....	Richmond.....	Dec. 15, 3 p.m.....	Furnishing, operating, repairing and maintaining 1,200 incandescent mantle, street lamps; alternative bid for furnishing material only.....	W. P. Knowles, Superintendent.
Dist. Columbia.....	Washington.....	Dec. 18.....	Gas franchise for city of Manila for 50 years.....	B. of I. A., War Dept., Wash., D. C.
Illinois.....	Litchfield.....	Dec. 18.....	Installing lighting system, 85 lamps.....	City Clerk.
Georgia.....	Washington.....	Dec. 20, noon.....	Constructing power plant, adding to waterworks and extending transmission system.....	B. Ficklen, Jr., City Clerk; Westinghouse, Church, Kerr & Co., Eng.
Dist. of Col.....	Washington.....	Dec. 20, 3 p.m.....	Installing lighting fixtures and wiring Post Office, Westfield, Mass.....	J. K. Taylor, Supervising Architect.
Illinois.....	Decatur.....	Dec. 28.....	Furnishing engine and 100 kw. generator, switchboard and other equipment.....	Albert Leach, City Clerk.
Kentucky.....	Louisville.....	Jan. 4, noon.....	Furnishing power equipment for city hospital including lighting, ventilating, vacuum cleaning and other equipment.....	Board Hospital Commissioners.
Michigan.....	Bay City.....	Jan. 17, 7.30 p.m.....	Furnishing and erecting ornamental arches.....	Electric Light Committee.
Australia.....	Brisbane.....	Jan. 30, noon.....	Designs, supply and erection at Mount Crosby Pumping Station of alternatively one, two and three complete units consisting of power generating pumps and plants, etc.....	Geo. Johnston, Albert St., S&W.Bd.
<b>BRIDGES</b>				
Kansas.....	Wichita.....	Dec. 11.....	Constructing 3 bridges.....	Jesse Leland, County Clerk.
Ohio.....	Canton.....	Dec. 15, 10 a.m.....	Constructing bridge over canal.....	County Comm.
Ohio.....	Columbus.....	Dec. 15.....	Constr. floor for bridge, protecting fence and box culvert.	County Commissioners.
Pennsylvania.....	Altoona.....	Dec. 15, 11.30 a.m.....	Repairing superstructure.....	Joint Bd. of Comm.
Montana.....	Kalispell.....	Dec. 16.....	Constr. 3 steel bridges.....	County Commissioners.
Montana.....	Libby.....	Dec. 16.....	Constructing 3 steel bridges across river.....	County Commissioners.
New York.....	Fulton.....	Dec. 18, 8 p.m.....	Constructing concrete steel bridge.....	J. A. Foster, Board of Public Works.
Iowa.....	Council Bluffs.....	Dec. 19, 2 p.m.....	Constructing wooden and steel bridges (Readvertisement).....	Board of Supervisors.
Iowa.....	Dennison.....	Dec. 20.....	Constructing bridges for year 1912.....	M. J. Collins, County Auditor.
New York.....	Albany.....	Dec. 20, noon.....	Constructing reinforced concrete arch bridge at Fulton.....	C. E. Treman, Supt. Pub. Wks.
Ohio.....	Dayton.....	Dec. 21.....	Constructing hand-lift bridge over canal.....	County Commissioner.
Ohio.....	Miamisburg.....	Dec. 21.....	Constr. a hand-lift bridge.....	County Commissioners.
Nebraska.....	Kearney.....	Dec. 21, noon.....	Constructing and repairing bridges.....	County Clerk.
Nebraska.....	Hastings.....	Dec. 23.....	Constructing bridges for year 1912.....	Board of Supervisors.
Louisiana.....	New Orleans.....	Dec. 28, 11 a.m.....	Constructing Strauss Trunnion Bascule Bridge.....	Chas. R. Kennedy, Comptroller.
Iowa.....	Preston.....	Jan. 4, 1:30 p.m.....	Bridge work, cost \$15,000.....	T. S. DeLay, County Survey.
Georgia.....	Atlanta.....	Jan. 15.....	Constructing viaduct, cost \$66,220.....	Robt. Clayton, Chm. Construction.
<b>FIRE EQUIPMENT</b>				
Virginia.....	Portsmouth.....	Dec. 8, 7 p.m.....	Furnishing rubber coats, boots, etc., for firemen.....	M. M. Adams, Chm. Fire Comm.
Minnesota.....	Minneapolis.....	Dec. 8, 7 p.m.....	Furnishing 1 or 2 automobile pumping engines.....	H. N. Knott, City Clk.
Massachusetts.....	Taunton.....	Dec. 11, 4.30 p.m.....	Furnishing auto combination chemical and hose wagon.....	E. A. Tetlow, City Clk.
<b>MISCELLANEOUS</b>				
New York.....	New York.....	Dec. 8, noon.....	Furnishing motor-driven boring, drilling, threading and cutting machine.....	Calvin Tomkins, Comm. Docks.
New York.....	New York.....	Dec. 11, 10.30 a.m.....	Constructing 4 firehouses.....	Jos. Johnson, Fire Comm.
Pennsylvania.....	Pottsville.....	Dec. 12, noon.....	Installing lighting fixtures, fire alarm system, etc., for hospital.....	County Comptroller.
New York.....	New York.....	Dec. 13, 11 a.m.....	Furnishing stationery, blank forms, etc.....	Wm. J. Gaynor, Mayor.
Ohio.....	Cleveland.....	Dec. 13, noon.....	Constructing city hall.....	E. A. Roberts, Clk City Hall Comm.
Pennsylvania.....	Pittsburgh.....	Dec. 15, noon.....	Furnishing iron work for concrete cells and locking devices in County workhouse.....	John A. Bell, Pres.
Dist. of Col.....	Washington.....	Dec. 23, 11 a.m.....	Constructing steel concrete floor, iron balcony, stairs, railings, etc., at U. S. Naval Magazine, Fort Lafayette, N. Y.	R. C. Hollyday, Chief Bureau.
Georgia.....	Atlanta.....	Jan. 25, noon.....	Constr. County Court house (4 contracts).....	County Commissioners.

## STREET IMPROVEMENTS

**Jacksonville, Ala.**—Election will probably be held in February for voting on \$300,000 or \$400,000 bond issue for improving of highways.

**Los Angeles, Cal.**—Board of Public Works has recommended street improvements.

**Pomona, Cal.**—Plans have been approved of for proposed street work on Park ave.

**San Francisco, Cal.**—Finance Committee of Supervisors have allowed Board of Public Works sums of money for various purposes, as follows: For granite curbs and grading and paving of half of Lyon st., between Union and Filbert sts., fronting Presidio reservation, \$4,000; for completing street work on Folsom st., from First to Second sts.; Tehama st., from Fourth to Fifth sts.; Harrison ave., from Seventh to Eighth sts., and Sherman st., from Folsom to Harrison sts., \$8,100, this amount being saved out of appropriation for paving Sansome st., from Jackson to Market sts.

**Washington, D. C.**—European firm that has placed orders for number of lines of American machinery informs an American consular officer that it would like to secure agency for American manufacturer of macadam mixing machine, capable of boiling pitch to heat of 437° F. and warming gravel to go into drum, the whole constituting one complete mix-

ing machine. No. 7631, Bureau of Manufactures.

**Washington, D. C.**—Orders have been issued by Engineer Department to grade Grand ave. and City View st.

**Rome, Ga.**—Petition has been received asking for paving of Second ave. and of Maple st. as far as E. Eighth st.

**Chicago, Ill.**—Second boulevard entrance to Chicago's downtown district, and to Grant's Park, from the south, is being planned.

**East Moline, Ill.**—Ordinance has been passed authorizing laying of 4 miles of sidewalks.

**Moline, Ill.**—Estimates on cost of widening Fifth ave., from 11th st. to 17th st., are being prepared.

**Quincy, Ill.**—Board of Public Works has recommended improvement of East Broadway, from 24th to 36th sts.

**Quincy, Ill.**—Resurfacing of Maine st. with creosote wood paving blocks, from Third to Eighth sts., is being discussed.

**Evansville, Ind.**—Effort is being made to have Locust st. improved with wooden blocks; estimated cost \$26,000, or about \$5 per front foot.

**Evansville, Ind.**—Improvement of Locust st. is being discussed.

**Fort Wayne, Ind.**—Board of Public Works is planning improvements to streets and sidewalks.

**Indianapolis, Ind.**—Effort is to be made at a meeting of Board of Trade Monday evening, December 4, to get movement under way to make boulevard of Allisonville road, from this city to Noblesville.

**Indianapolis, Ind.**—Following streets will be improved as follows: Kealing, from New York to Michigan, walks, gravel roadway and curb; Ruckle, from 30th to 33d, roadway.

**Michigan City, Ind.**—Board of Public Works has decided to pave Detroit st. to point 15 ft. east of center line of Lafayette st.; also portion of Pearl st.

**Noblesville, Ind.**—Citizens will hold meeting with Indianapolis business men for purpose of considering proposition to make Indianapolis pike, between Capital City and Noblesville, a boulevard.

**Richmond, Ind.**—Resolutions for improvement of West and East Main st. were ordered prepared by City Engineer.

**Richmond, Ind.**—Board of Public Works has recommended paving of Sheridan st. with brick.

**Richmond, Ind.**—City Engineer has been instructed to prepare plans for proposed boulevard to be built along banks of Whitewater River.

**Richmond, Ind.**—Resolutions have been adopted for improvement of North C st., from Fort Wayne ave. to 16th st., by construction of cement sidewalks on both sides and cement curb and gutters; to



construct cement sidewalks and curb and gutter on South 17th st., from A to B.

**Fort Scott, Kan.**—Resolution has been passed providing for grading and macadamizing of portion of Catherine st.

**Boston, Mass.**—Brookline Selectmen are considering petition regarding laying out of new street over aqueduct, near Chestnut Hill ave.

**Boston, Mass.**—Board of Street Commissioners has recommended the laying out of and construction of Lovering place, City Proper, as highway from Washington st. to Harrison ave.; also laying out and construction of extension of Curtis st., East Boston, as highway from Saratoga st. to Bennington st.

**New Bedford, Mass.**—Petition is being circulated asking that city lay out Brownell ave. for speedway.

**Springfield, Mass.**—City Engineer has prepared estimate of cut of extending Water and Dwight sts., and same will shortly be considered.

**Kalamazoo, Mich.**—Walbridge st., from Kalamazoo ave. to Willard st., will be paved; also following streets: Burdick st., Axtell to Reed st., concrete base with asphalt; Douglas ave., north to Alamo, brick; West st., north to Patterson, concrete; East ave., Gilbert to Phelps, asphalt macadam; Harrison st., Main to Gull, asphalt macadam; Gull, Harrison to bridge, asphalt macadam; Walbridge st., Kalamazoo ave. to Willard, brick. Bids for work will be advertised late in December.

**Magnolia, Miss.**—Voters have decided in favor of \$12,000 bond issue for construction of cement sidewalks, and bids will be received December 5 by Mayor and Board of Aldermen for purchase of issue.

**Saginaw, Mich.**—Proposition has been introduced for issuing of sidewalk bonds in sum of \$100,000.

**Tittabawassee, Mich.**—Proposition has been carried for \$20,000 bond issue for good road purposes.

**Hastings, Neb.**—Petition will be presented asking for repaving of Second st., between St. Joe and Burlington aves.

**Atlantic City, N. J.**—Measures for paving of uptown avenues are being considered by Street Committee of Council.

**Camden, N. J.**—Bids will be received until 11 a.m., Dec. 13, by Board of Chosen Freeholders for purchase of all or part of \$12,000 bonds for improving Chapel ave., Gibbsboro and Berlin roads, and \$20,000 of bonds for resurfacing and improving Camden and Westfield Turnpike road. John Prentice, Director.

**Jersey City, N. J.**—Street and Water Board have certified to Board of Finance costs of following improvements: Van Reypen st., Academy st. to Sip ave., \$3,144.66, cost to city \$502.91; Colden st., Varick to Monmouth sts., \$3,913.92, cost to city \$595.92; 12th st., Coles to Monmouth sts., \$4,939.31, cost to city \$67.31.

**South Amboy, N. J.**—Ordinance providing for paving of Broadway with bitulithic is being considered.

**Trenton, N. J.**—Issuance of bonds amounting to \$18,000 have been authorized for following improvements: Yardville and Allentown road, McGovern Construction Co., \$18,000.

**Oneonta, N. Y.**—At regular meeting of Common Council report of Board of Public Works was accepted and Council voted assessment amounting to about \$25,000 to cover cost of improvement to Grand st. in way of bituminous macadam surface and concrete gutters, and stone curbing and various new walks, including Main st. walk at East End and Tilton ave. walk.

**Schenectady, N. Y.**—Board of Estimate and Apportionment have approved of Lafayette st. widening and extension ordinance, recently passed by Common Council and signed by Mayor.

**Seneca Falls, N. Y.**—Farson, Son & Co., of New York, were lowest bidders for two blocks of \$31,000 paving bonds.

**Syracuse, N. Y.**—Property owners in South Salina st., between Onondaga and Temple sts., have petitioned Common Council to take action for restoring street to its original width by acquiring land on west side.

**Yorkville, N. Y.**—Bitulithic pavement will be laid in this village as well as Mohawk and Rome.

**Columbus, O.**—Residents of West Mound st. have petitioned Council to repair street from High st. to Central ave.

**Dayton, O.**—Resolutions have been adopted for improvement of Clover st., from Fillmore st. to Nassau st.; to improve Dunbar ave., from Fifth st. to Germantown st.; to improve West Third st., from Abbey ave. to Northampton ave.; Delaware ave., from east line of lots Nos. 33,288 and 33,269 to Wheatley ave.; Delaware ave., from Richmond ave. to Wheatley ave.

**Dayton, O.**—Ordinance is being considered for issuance and sale of bonds for improvement of Huffman ave., from Marty ave. to Overlook ave., and for various other street improvements.

**Dayton, O.**—Bids are being received for paving of Burkhart ave. in vicinity of Huffman Hill; North Main st. alongside of Fairview Park and hill crest.

**Dover, O.**—Bids will be received until 12 noon, Dec. 26, at office of Village Clerk, for purchase of \$12,000 bonds, for purpose of paying portion of cost of improvement of Center Ridge road. Clifford Pease, Clerk.

**Newport, O.**—Council has passed several ordinances awarding contracts for improvement of nearly 2 miles of streets.

**Springfield, O.**—Paving of Columbia st., from Limestone to Lagonda ave., is being considered; estimated cost \$28,000.

**Toledo, O.**—Ordinances have been passed providing for improvement of First st. and Waite ave.

**Muskogee, Okla.**—Ordinance has been passed providing for opening of Cincinnati st., from Cherokee st. to Main st.

**Milton, Ore.**—City has decided to macadamize Milton st., and has ordered rock crusher.

**Portland, Ore.**—The Oregon Independent Paving Co. was lowest bidder for improvement of portion of Sandy boulevard, between E. 28th and E. 35th sts., at \$28,035. Unit price for asphalt quoted in this bid was \$1.65 per sq. yd.

**Erie, Pa.**—Ordinances have been passed for paving Myrtle st. and for grading, draining and curbing both sides of Summit st.

**Erie, Pa.**—Ordinances have been passed providing for grading, curbing, where not already curbed, and paving of Seventh st., from Wallace to East ave.; to re-establish grade of Holland st., from 31st st. 80 ft. north of 29th st., amended to read according to third print; establishing grade of 24th st., from East ave. to Railroad st.; to repave Diamond alley, between 12th and 14th sts. and Peach and State sts.; to re-establish the grade of Poplar st., between 23d and 26th sts.

**Lebanon, Pa.**—Ordinance has been passed providing for opening of Sixth st. north from Guilford st. to city limits.

**Norristown, Pa.**—New road will be opened from Norristown to Springhouse and Summeytown turnpike.

**Sharon, Pa.**—Council has passed two paving ordinances, requiring improvement of Ridge ave., from Seventh st. to borough limits, and Seventh st., from Main to Ridge.

**Washington, Pa.**—Council is taking steps towards repaving of Jefferson ave., between Chestnut st. and Hallam ave.

**Providence, R. I.**—Widening of Elmwood ave. is being discussed.

**Fountain City, Tenn.**—Better roads for city and surrounding territory are being considered.

**Beeville, Tex.**—Bonds amounting to \$125,000 for roads will be sold. Commissioners will purchase road machinery, such as traction engine, roller, graders, etc. Bids on same are required.

**Bonham, Tex.**—Commissioners' Court has decided to pave 10 ft. from where city's paving stops around court house, bringing fence out to paving.

**Bonham, Tex.**—City Council has ordered paving of W. Fifth st., from square to High School building, and two blocks on W. Fourth st., from public square. Bids have been advertised.

**Dallas, Tex.**—All bids for paving of Jackson st., from Jefferson to Houston, have been rejected, and Secretary will readvertise for bids for this improvement.

**Dallas, Tex.**—Extension of Magnolia st., from Ross ave. to Elm st., is being discussed.

**Dallas, Tex.**—Proposition has been adopted for dedication to city of land necessary to change South Merlin st., from width of 50 to 60 ft., and to change

width of Jeffries st. from 50 to 60 ft. Plans have also been perfected for making east line of Oakland ave. as projected 175 from Oak lane extend all way to Grand ave., making Oakland ave. 12½ ft. wider between Cranfill st. and Grand ave.

**Dallas, Tex.**—Petition has been received asking for ordinance providing for construction of sidewalks, curbs and gutters on Garrett, from Ross to Franklin; on Ross, from Fitzhugh to Greenville, and on Bennett, from Ross to Franklin.

**Jacksonville, Tex.**—County Commissioners' Court has ordered election levying tax of 25 cents on \$100 valuation in precinct surrounding Jacksonville for purpose of constructing and improving public roads in this vicinity.

**Orange, Tex.**—Petition is being circulated asking for election to determine whether or not Orange County shall issue bonds to amount of \$250,000 for good roads.

**Pecos, Tex.**—Election will probably be held Jan. 19, 1912, for voting on \$100,000 good roads bond issue.

**Salt Lake City, Utah.**—Petition is being circulated asking that Ninth South st. be paved from Fifth East to Sixth East, and main entrance to Liberty Park.

**Barton Heights, Va.**—The \$20,000 bond issue for general improvements has been adopted and approved by citizens of Barton Heights, the vote being 142 to 2.

**Danville, Va.**—Bonds in sum of \$180,000 have been sold to Equitable Life Assurance Society, and funds will be used in street improvements, and also for erection of up-to-date electric light plant.

**Norfolk, Va.**—Ordinance has been passed providing for new pavement on Church st., from Main to Goff st.

**Norfolk, Va.**—Improvement of Church st. is being discussed; estimated cost \$11,675.

**Norfolk, Va.**—Appropriation of \$5,000 has been made for sidewalks in 10th Ward.

**Aberdeen, Wash.**—Initial steps have been taken towards bonding Chehalis County for \$1,000,000 for purpose of building good roads on sound and permanent basis, and organization of a company to build uncompleted portion of Aberdeen to Westport road and to install and operate ferry in connection with road.

**Seattle, Wash.**—City has decided to improve Latona ave., from Woodlawn ave. to E. 85th st., by constructing water mains.

**Green Bay, Wis.**—Sum of \$29,495.66 will be spent towards improving highways in Brown County.

#### CONTRACTS AWARDED.

**Mobile, Ala.**—By City Commissioners, for 800 yds. cement sidewalk around Ryan Bank, to Koolman & Co.

**Jacksonville, Fla.**—By City, for paving Atlantic boulevard, from city limits in South Jacksonville, distance of 6,000 lin. ft., to Logan Concrete & Engineering Co., at following prices: Vitrified brick, \$1.33 per sq. yd.; vitrified curbing, 18 cents per lin. ft.; grading, 25 cents per cub. yd.

**Washington, D. C.**—To Benj. B. Knell, at \$1,275, for construction of cement walks, etc., at school, at 8th and T sts.

**Pensacola, Fla.**—By City, for 30,000 sq. yds. of their patented Granocrete pavement, to Rudolph S. Blome Co., Unity Building, Chicago, Ill.

**Pensacola, Fla.**—By Board of Bond Trustees, to Rudolph S. Blome Co., Unity Building, Chicago, for construction of more than 30,000 sq. yds. of patented granocrete pavement.

**Herrin, Ill.**—By City Council, for construction of 43,000 ft. of granitoid sidewalk, to Keeley & Tweeney, of East St. Louis, Ill., for \$52,842.

**Oak Park, Ill.**—By Board of Local Improvements, to American Asphalt Paving Co., 133 West Washington st., Chicago, at \$8,972.60, for asphaltic concrete pavement and Portland cement granite concrete combined curb and gutter in Fair Oaks ave., between Augusta and Division sts.

**Springfield, Ill.**—By Board of Public Works, to Rich. F. Egan, 116 S. 4th st., at \$40,000, for asphalt street paving on Kennedy st.

**Rock Island, Ill.**—By Board of Local Improvements, for grading and paving 38th st., from Seventh to 18th aves., to Tri-City Construction Co., of Davenport, Ia., at following figures: Paving, \$1.74 per sq. yd.; concrete curbing, 60 cents

per ft.; stone curbing, 53 cents per ft.; excavation, 35 cents per cu. yd.; 10-in. sewer, 58 cents per ft.

**Lafayette, Ind.**—By Tippecanoe County Commissioners, to Snyder & Barnett, Frankfort, Ind., for gravel road improvement, along Martin and Erwin roads.

**Chanute, Kans.**—To Perry Taylor, for grading, curbing and macadamizing West First st., from Lafayette to Steuben ave.

**Osage City, Kan.**—To McGuire & Stanton Construction Co., Leavenworth, Kan., for construction of vitrified brick block pavement and concrete curb and gutter on Sixth st., Osage City.

**Franklin, La.**—By City Council, for paving 4,000 sq. ft. of sidewalks and 1,000 ft. of brick curbing to De Jersey and Barnard.

**Fort Scott, Kan.**—To Midland Construction Co., by City Council, for paving of Burke st., between Sixth and Ninth, with brick at following figures: Curbing, 35 cents per lin. ft.; excavation work, 40 cents per cu. yd.; brick paving, \$1.45 per sq. yd.; macadam work, 55 cents.

**Leavenworth, Kan.**—By Board for paving Ottawa st., from Fifth to Broadway, to McGuire & Stanton, at \$7,530.18, and for constructing alley in Todd tract, to Fred Tarry & Son, at \$579.46.

**Franklin, La.**—By City, for paving 4,000 sq. ft. of sidewalks and 1,000 ft. of brick curbing, to De Jersey & Barnard, Jennings, La.

**New Orleans, La.**—By City, for paving with granitoid Sycamore st., from Lowerline to Leonidas, to Thomas Eagan, at \$2.37 per sq. yd. Other bidders were: R. S. Blome Co., at \$2.60, and Standard Co., at \$3.10.

**Boston, Mass.**—For construction of tar macadam roadway in Canterbury st., West Roxbury District, to Thomas F. Minton, at \$10,636. Other bids were: James Doherty, \$12,463; John Kelly Co., \$12,783; West Roxbury Trap Rock Co., \$12,803; Moore & Co., \$15,686. For construction of tar macadam roadway in Fisher ave., Roxbury District, to James Doherty, at \$10,025. Other bids were: John McCourt & Co., \$10,129; J. C. Coleman & Sons Co., \$10,175; John Kelly Co., \$12,005.

**Baltimore, Md.**—By Board of Awards, for paving streets around Fifth Regiment Armory, to the F. E. Schneider Paving Co., for \$48,928. Barber Asphalt Co. submitted next lowest bid.

**Baltimore, Md.**—By State Roads Commission, to M. Jewell, Annapolis, Md., at \$21,621, for construction of section of State highway, between Owings and Mt. Zion.

**St. Hillaire, Minn.**—By Town Boards of River Falls and Black River, and Village Council of St. Hillaire, to Henry Swenson and Alfred Olson, for construction of public highway.

**Springfield, Mo.**—By Commissioners of East Division St. Road District, for building of good roads in Green County, approximating five and one-half miles, to J. A. M. Lanier, for \$10,500.

**Webster Groves, Mo.**—For macadam street paving as follows: Newport ave., to Heman Construction Co., Holland Building, St. Louis, \$18,000; Florence ave., to Oscar & Davis Construction Co., Webster Groves.

**South Omaha, Neb.**—For street improvements: 65,000 sq. yds. paving, to Dan. Hanlon, 514 N. 27th st., Omaha; 65,000 sq. yds. paving, to National Construction Co., Elks building, Omaha.

**Collingswood, N. J.**—By Council, for curbing, to Augustus Stezer, at 30 cents per lin. ft.

**Albany, N. Y.**—By Board of Contract and Supply, for grading Partridge st., from Myrtle ave. to Warren st., to Goldsmith C. Stephens, for \$780.

**Syracuse, N. Y.**—By City, for paving Lodi st., from Green to James, to F. J. Baker, at \$7,155.15.

**Syracuse, N. Y.**—By City, for resurfacing with asphalt pavement in North Clinton st., between West Genesee and Noxon sts., to Warner-Quinlan Asphalt Co., at \$1,468.80; for paving Seneca st., between Marcellus and West Fayette, to Samuel Bown, at \$3,216.20.

**Syracuse, N. Y.**—By Board of Contract and Supply, to F. J. Baker, at \$7,155, for paving Lodi st., between Green and James sts.

**Troy, N. Y.**—To Corliss Construction Co., bidder for improvement of Excelsior ave.

**Akron, O.**—By Portage Engineering Co., 540 Akron S. & L. Building, at \$18,000, for brick paving in Jefferson and Everett sts.

**Cadiz, O.**—By Harrison County State Highway Commissioners, for improving Cadiz-Jewett road, to J. P. Warnick, Cadiz, at \$9,869.

**Canton, O.**—To P. Campbell, city, for curb and sidewalk improvements in E. Third st.

**Clyde, O.**—By Board of Public Service, to Henry Sheenan & Son, Toledo, O., for 5,380 sq. yds. of paving on East and West Forest sts.

**Fremont, O.**—By City, to H. C. Durand, for 4,000 sq. yds. of paving on Hayes ave.

**Plymouth, O.**—By Trustees of Plymouth Township, to Tuttle & Ervin, for construction of 1,060 ft. of 12-ft. of macadam road.

**Port Clinton, O.**—By Ottawa County State Highway Commissioners, for improving Bell road, to E. S. Bryant, of Bloomdale, at \$3,532.72.

**Springfield, O.**—By Board of Commissioners of Clark County, to Charles Bird, city, at \$15,000, for construction of 2.22 miles of road.

**Youngstown, O.**—By Board of Control, to James McCarron & Son, for paving Dewey ave., at \$10,883.

**Belle Vernon, Pa.**—For paving 900 ft. on Broad ave., to O'Connor & Madigan, Connellsville, Pa., at \$6,911.

**Scranton, Pa.**—By Council, for paving Mill st., between Seventh and Eighth aves., to John Booth, as follows: Brick paving, \$2.50 per sq. yd.; 75 cents per lin. ft. for setting curbing. The other bidder, Roland Bros., wanted \$2.52 per sq. yd. for paving and 75 cents per lin. ft. for curbing.

**Newport, R. I.**—To Loftus & Dugan, New Bedford, Mass., at \$4,780, for vitrified brick paving at U. S. Naval Torpedo Station.

**Charleston, S. C.**—For constructing vitrified brick pavement on Americus and Columbus sts., to Charleston Engineering & Contracting Co., Charleston, S. C., at about \$7,500.

**Farmersville, Tex.**—To C. H. Foley, Sherman, Tex., for construction of concrete crossings, curb, gutters and culverts, at Farmersville.

**Pasco, Wash.**—By City Council, for paving four blocks on Fourth st., to Barber Asphalt Paving Co.

**Spokane, Wash.**—By City Council, for curbing, parking and sidewalking Normandale st., Boone to Cataldo ave., estimate \$1,500, to A. D. Robinson, lowest bidder, at \$1,418.

## SEWERAGE

**Roseville, Cal.**—Another step was taken in movement to procure municipal lighting plant for city, when order authorizing transfer of \$10,000 worth of bonds from sewer fund to electric light fund was made by Trustees.

**Bridgeport, Conn.**—Sewer Commission has made beginning on enlarging of sewer system of city by voting to call for bids for portion of Brooklawn sanitary trunk sewer, according to revised plans of Engineer Rudolph Haring. These bids will call for construction of 3,876 ft. of 30-in. sewer and 1,487 ft. of 24-in. sewer, from Maplewood ave., Dewey st. and Brooklawn ave. to Cleveland ave., bids to specify brick or cement and tile construction.

**Bridgeport, Conn.**—Bids have been called for to extend sewer emptying into Berkshire pond about 100 ft. below dam.

**Rockville, Conn.**—Public Works Committee of City has recommended to Common Council that citizens be asked to appropriate \$6,000 for storm sewer on Prospect st., from Ellington ave. to Union st.

**La Salle, Ill.**—Taxpayers will vote on following proposition: To appropriate \$140,000, for installation of sewer system and sewer disposal works.

**Indianapolis, Ind.**—Resolutions have been passed for construction of sewers on Wheeler st., from Glen drive to Roosevelt ave., and on Adams st., from Glen drive to 25th st.

**Richmond, Ind.**—Resolution has been adopted for construction of sanitary sewer

er from 16th to 17th sts., from North E. to railroad.

**Fort Scott, Kan.**—Worley & Black, supervising engineers and contractors of Kansas City, who have been employed by city to make preliminary surveys, blue prints and estimated cost of big East Side sewer, have completed work and will shortly make report to Mayor and Council.

**New Bedford, Mass.**—Order has been adopted by Board, appropriating \$7,500 for construction of sewer in Hatch st.

**Duluth, Minn.**—Construction of storm sewer between Huron st. and the bay is petitioned for by residents.

**Mountain Grove, Mo.**—Taxpayers are advocating special election for voting on \$25,000 bond issue for construction of municipal sewerage and waterworks system.

**Butte, Mont.**—Voters at next election will probably have opportunity of voting on question of \$150,000 bond issue for general storm and sanitary sewer.

**Hastings, Neb.**—Council has ordered construction of sewer lateral in South st., from Colorado ave. to Lincoln ave., with branch through alley north and south in Block 6 of St. Joe addition.

**Tecumseh, Neb.**—Bids will be received until 4 p. m. Dec. 18 by City Council for purchase of \$7,000 Sewer bonds in \$500 denomination. N. M. Davidson, City Clerk.

**Bloomfield, N. J.**—The sewerage problem will be subject of conference between members of Bloomfield and Glen Ridge councils. Meeting will be held in Glen Ridge Council chamber.

**Milburn, N. J.**—Resolution has been adopted for construction of sewers in various streets.

**Orange, N. J.**—Convinced that Imhoff system of sewage disposal has many practical features, Orange Common Council has decided to authorize Joint Sewer Committee of Orange, Montclair and East Orange to have plans and specifications prepared for construction of sewage purification plant at site located in Bloomfield and Belleville.

**Totowa, N. J.**—Mayors and Councilmen from Totowa, Haledon and Prospect Park boroughs are considering subject of sewage disposal. The Imhoff disposal system was discussed.

**Trenton, N. J.**—City has been ordered by State Board to install sewage disposal plant as part of general plan to stop polluting of Delaware River.

**Trenton, N. J.**—Ordinance has been passed authorizing construction of drain No. 96 in Woodland st., from Dayton st. to Adams st.

**Binghamton, N. Y.**—Work will be started early in spring on intercepting sewer system, which will precede construction of sewage disposal plant.

**Niagara Falls, N. Y.**—Members of Board of Public Works are discussing propositions made by City Engineer for new sewer systems to drain territory adjoining Falls st.

**Oswego, N. Y.**—Committee of East Side taxpayers has called upon Mayor Fitzgibbons with view of obtaining from him idea as to when taxpayers' election on sewer bill providing for erection of two trunk sewers at cost of \$190,000 is to be held.

**Scarsdale, N. Y.**—Installation of sewerage system to cost \$125,000 is being considered. Meeting will be held Dec. 8 for discussing the subject.

**Yonkers, N. Y.**—Engineer A. P. Hartman is preparing plans for building pipe line of 150 ft. to extend out to bulkhead line at cost of about \$70,000. Advertisements for contracts will be ready in a few weeks.

**Akron, O.**—Ordinances have been passed providing for bonds for construction of sewers in various streets.

**Columbus, O.**—Two ordinances for sewer extensions have been passed, involving bond issues aggregating \$25,000.

**Dayton, O.**—Ordinance is being considered for issuance of bonds for construction of storm water sewers on certain streets in sum of \$20,000.

**Springfield, O.**—Storm sewer will be constructed on Belmont st., from Main st. to Lagonda ave., at cost of \$12,000.

**Springfield, O.**—Contract will be let Dec. 5 for construction of storm sewer on Columbia st., from Limestone to Lagonda ave., at cost of about \$4,000.



Plainfield, N. J.—Chas. A. Peterson, of Plainfield, was lowest bidder on construction of sewer at \$6,454. Itemized bids are as follows:

Quantity	8" vitr. pipe under 6 ft.	8" vitr. pipe 6 to 8 ft.	8" vitr. pipe 8 to 10 ft.	8" c. i. pipe under 6 ft.	8" c. i. pipe 6 to 8 ft.	Manholes.	1" flushing connections.	2" wrought iron air main.	Branches on 8" vitr. pipe sewer.	Tees on 8" c. i. pipe sewer.	4" vitr. pipe house connections.	4" c. i. pipe house connections.	8" vitr. pipe discharge main.	8" flap valve.	Operating vault.	Pumping plant.	Extra for asphalt joints.	Extra for "G. K."
1,650	884	40	580	96	9	4	1,710	95	20	530	180	175	1	1	1	200	200	
ft.	ft.	ft.	ft.	ft.	ft.	each	each	each	each	each	each	each	each	each	each	each	each	each
Chas. A. Peterson, Plainfield, N. J.	\$0.44	\$0.65	\$0.95	\$1.40	\$1.85	\$55.00	\$20.00	\$0.33	\$0.50	\$8.00	\$0.30	\$0.90	\$0.44	\$30.00	\$650.00	\$1,675.00	\$0.03	\$0.10
Julian M. Solomon, Jr., Philadelphia	.60	.70	.95	1.40	1.50	70.00	25.00	.30	.45	3.00	.45	.70	.60	35.00	500.00	1,750.00	.10	.17
John W. Heller, Newark, N. J.	.70	.90	1.11	1.30	1.50	50.00	25.00	.54	.45	7.00	.35	.70	.70	40.00	547.00	1,500.00	.15	.25
T. Foster Callahan, Elizabeth, N. J.	.60	.71	.80	1.30	1.45	70.00	17.50	.36	.50	6.50	.45	1.50	.48	26.00	1,200.00	1,650.00	.10	.20
A. B. Nicholas & Co., Inc., Brooklyn	.54	.75	1.10	1.40	2.00	65.00	21.00	.45	.50	7.75	.55	.90	.70	35.00	1,100.00	1,575.00	.35	.45
Alfonso Colucci, Plainfield, N. J.	.47	.59	.69	1.20	1.32	59.00	20.00	.32	.60	10.00	.35	.90	.55	35.00	1,600.00	1,750.00	.07	.16
Whiting-Turner Constr. Co., Balt.	.745	.96	1.21	1.37	1.58	66.50	28.60	.415	.65	9.95	.55	.76	.745	45.50	742.00	1,655.00	.20	.20
Edgar & Juan, Woodbridge, N. J.	.78	.90	1.10	1.58	1.70	60.00	25.00	.95	.65	2.00	.65	.90	.80	25.00	800.00	1,732.00	.02	.07
Middlesex Contr. Co., Elizabeth, N. J.	.75	.80	.87	1.46	1.71	49.00	24.00	.48	.60	15.00	.46	1.05	.60	35.00	1,895.00	1,700.00	.20	.30

**Pleasant Ridge, O.**—Bids will be received until 12 noon, Dec. 23, by Clerk of Village, for purchase of \$85,000 worth of bonds for construction of sewers and sewage disposal plant. H. B. Hayden, Clerk.

**Toledo, O.**—Resolution has been adopted for construction of local sewer No. 1,130, in Main Sewer District No. 29.

**Erie, Pa.**—Ordinances have been passed providing for 9-in. sanitary sewer in 23d st., from east line of Parade st. east 600 ft., and providing for 9-in. lateral tile sanitary sewer in Moorhead st., from Peach to Kellogg st., and in Kellogg st., from Moorhead st. south 700 ft.

**Scranton, Pa.**—Petition has been received asking City Council for construction of sewer to drain surface water from Tripp Park through ravine to Providence rd.

**Dallas, Tex.**—Petition has been received for extension of sanitary sewer on east side of Beckley ave. and west side of Englewood ave., between Oakwald and Tilden; also for water mains and sewer through Halley ave.

**Dallas, Tex.**—Imhoff sludge tank as main equipment for proposed sewage disposal plant will probably be recommended.

**Dallas, Tex.**—City Secretary has been instructed to advertise for bids for laying 6-in. sanitary sewer in alley between 12th and Center sts., west of Zang's boulevard, and to advertise for bids for 561 sewer laterals and 22 manholes on Bryan st., preparatory to paving this street. Approximate cost of Bryan st. improvements will be \$1,104.

**Richmond, Va.**—Resolutions have been passed authorizing construction of sewer in Mechanicsville Turnpike to cost \$100; in Mosby st., from Carrington to Jay st., to cost \$1,975; sewer in S st., from 25th to 26th st., to cost \$900; sewer in R st., from Mechanicsville Turnpike to 19th st., to cost \$900; sewer in Q st., from 19th to 20th st., to cost \$500.

#### CONTRACTS AWARDED.

**Osceola, Ark.**—For construction of sewers for city, to Roetzler & Chipman, Evansville, Ind., at \$16,762.

**Coalinga, Cal.**—For construction of new sewer, to H. M. Shaffer, at \$23,316.

**San Francisco, Cal.**—For constructing Section "B" of Ingleside outlet sewer, by Board of Public Works, to Coast Improvement Co.

**San Francisco, Cal.**—By Board of Public Works, for construction of sewers in 23d ave., between Geary and Onza st., to Earl Ehrhart, at \$8,179.50.

**Denver, Col.**—For sewers to include 46,107 ft. 8-in. vitr. pipe sewers in Sub. Dist. No. 10, West and South Side Sanitary Sewer Dist., to Wescott-Doan Investment Co., at \$27,785. Other bidders: Denver & Pueblo Construction Co., \$30,054; Dillon Stone Co., \$30,924; J. R. Gordon, \$31,224; Commonwealth Construction Co., \$32,492; Gaffy & Keefe Construction Co., \$33,388; National Construction Co., \$33,653; Peter O'Brian Construction Co., \$33,854; Dennis Gibbons Construction Co., \$35,878; Tully Construction Co., \$54,536.

**Washington, D. C.**—By District Commissioners, for construction of sewers as follows: Sewer in 30th st. N. W., and Petworth Valley Outlet, to E. G. Gum-

mell, 300 Rhode Island ave.; sewer in 32d st., to W. F. Brenizer Co., First and Q sts.; section 1, East Side interceptor and sewer in Bunker Hill road, to George Hyman, foot of S. Capitol st.; sewer in Conduit road, to R. J. Malone, 1341 Clifton st.

**Des Moines, Ia.**—By City, for constructing clay-pipe sewers, to J. L. Hansman, on 39th st., at 91 cents per lin. ft., and to Geo. M. King, for 29th st. sewer, at 97½ cents per lin. ft.

**Belleville, Ill.**—For McKenzie place sewer, by Board of Local Improvement, to Hoeffken Bros., of Belleville, for \$34,756.

**Bloomington, Ill.**—For 1,000 ft. 4-ft. brick sewer, to P. F. McDonald, of Bloomington, for \$4,149.

**Dwight, Ill.**—By Board of Village Trustees, to Keys & McNamara, La Salle, Ill., for construction of sewers.

**Plainfield, Ill.**—To Heggie, of Joliet, for sewer system in Plainfield for \$22,022. Other bidders: Jas. Healy, Chicago, \$26,879; Ottawa Construction Co., \$25,826, and Wm. Moran & Co., Joliet, \$23,965.

**Terre Haute, Ind.**—By Board of Public Works, for sewer contracts: Ninth st., 10th st., Wabash ave., Cleveland st. and 23d st., to P. O'Leary, 25 1½ st.; College ave., Third ave., Woodley ave. and Sycamore st., J. P. Welsh, 911 N. 23d st.; 12th st. sewer, Luke Sweeny, 1509 Second ave.

**Hopkinsville, Ky.**—For construction of sewer from Virginia st. through 10th st. to river, to Meacham Construction Co., for \$4,000.

**Grand Rapids, Mich.**—By Board of Public Works, to Vander Weile Bros., for Adrian st. sewer, at \$939.56.

**International Falls, Minn.**—By Koochiching Townsite Co., to N. B. Olander, for construction of sewer on Fourth st., between Second and Fifth aves.

**Asbury Park, N. J.**—To John R. Jeffrey, for sewer work, for \$4,650, and it is said that when this work is done septic tank and pumping station will be odorless.

**Glen Ridge, N. J.**—For construction of sewers as follows: Bay ave. and Forest ave. sewers, Jos. Cestone, Montclair, N. J., \$875 and \$510, respectively; Outlook place sewer, Jas. T. Boylan, Belleville, N. J., \$522.

**Plainfield, N. J.**—By Common Council, for building extension of sanitary sewer in Lenox and Cameron aves. and Loraine road, to Charles A. Peterson, at \$6,454.

**South Orange, N. J.**—By Bd. Village Trus., for 10,000 lin. ft. 8-in. sewers, 32 manholes, 5 flush tanks, 200 Y specials and 500 cu. yds. rock excavation, to Pasquale Cestone, 77 Glenridge ave., Montclair, for \$10,022.

**Albany, N. Y.**—By Board of Contract and Supply, for sewer in Lawn st., T. E. Kerwin, for \$1,267.30; sewer in Dove st., T. E. Kerwin, \$912.60; sewer in Ontario st., \$841.42.

**Rochester, N. Y.**—By Board of Contract and Supply, as follows: To H. N. Cowles, of Rochester, the Thomas Creek overflow sewer for \$36,762, and Wm. Sours, 2d, for the Garson ave. and Merchants rd. overflow, for \$42,502.

**Rochester, N. Y.**—By Board of Contracts, as follows: To W. H. Sours, at \$42,502, for East Side trunk sewer over-

flow, and to H. N. Cowles, at \$36,762, for Blossom road storm sewer.

**Syracuse, N. Y.**—By City, for building 12-in. pipe sewer in Worden st., from Manlins st. to end of Worden st., to Charles Bonn, at \$991.

**Akron, O.**—To Portage Engineering Co., 540 Akron S. & L. Building, for construction of storm sewer in High st.

**Erie, Pa.**—By Council, for construction of 9-in. lateral tile house sewer in Sassafras st., from Short st. southwardly 110 ft., to Mr. Diefendorf, at \$1.25 per ft. for 9-in. pipe and laying, 60 cents for 6-in. pipe, \$1.50 for Y and T branch, and \$45 for manholes.

**Piqua, O.**—For construction of Decker sanitary sewer, to Shannon & Siegler, at \$6,506.

**Philadelphia, Pa.**—By Department of Public Works, for construction of sewers as follows: New sewer, Hunting Park ave., from Sixth to Ninth st., John L. Buckius, for \$10,000; new sewer, Luzerne st., from 10th st. to Old York road, to John L. Buckius, for \$5,000; Cobb's Creek intercepting sewer, extension in Cobb's Creek Park, from Thomas st. to Baltimore ave., to David Peoples, for \$30,000; 57th st. extension, from present terminus north of Lebanon ave. to Susquehanna ave., to Ryan & Kelly, for \$10,000; Frankford intercepting sewer extension to Torresdale ave., to Donato Delice, for \$40,000; Pennypack Creek intercepting sewer extension in Race road, from Mill st. to Frankford ave., and in Frankford ave., from Race road to Ashburner st., to John McMenemy, for \$30,000; Rock Run sewer extension, in Sixth st., from Fisher's ave. to Brookdale st., and in Brookdale st., between Sixth and Seventh sts., to David Peoples, for \$30,000. There were 47 branch sewer awards in various sections of city to value of \$200,000.

**Columbia, S. C.**—By Council, for construction of six blocks of sewerage mains and six blocks of water mains, to Columbia Concrete Co., at \$5,300.

**Mobridge, S. Dak.**—To Mobridge Concrete Construction Co., for installation of system of sewers.

**Salt Lake City, Utah.**—By Board of Public Works, for construction of pipe sewers, as follows: Extensions Nos. 295 and 296, Clark & Co.; extensions Nos. 297 and 298, J. F. Johnson.

**Richmond, Va.**—By City, for construction of two main trunk sewers in Washington Ward, to A. W. Maynard, at \$13,137.50 and \$32,989.50.

**Spokane, Wash.**—By City Council, for sewerage Nora ave., from Washington st. to 266 ft. east, estimate \$513, to Burnett & Brown, at \$470.

**Racine, Wis.**—By Board of Public Works, to Hanson & Sorenson, for construction of the 20th st. sewer.

#### WATER SUPPLY

**Bessemer, Ala.**—Election has been called for Dec. 11 for voting on issuance of bonds for purchase of water plant.

**Gadsden, Ala.**—Installation of water meters is being considered.

**Redlands, Cal.**—Water Commissioner has engaged F. E. Trask, of Los Angeles, to prepare plans for municipal water-works.

**San Mateo, Cal.**—Plans for municipal water system, which have been un-

der consideration, came to head at meeting of Board of Town Trustees, when San Mateo Water Co. placed selling figure on its plant and water rights of \$340,000, while City Engineer Bromfield estimated that city could install its own distributing plant for \$227,000. Trustees decided to call mass meeting, to be held Dec. 7, when matter will be submitted to people.

**Watsonville, Cal.**—Ordinance has been passed providing for bonding of City in sum of \$100,000 for purpose of installing municipal water system.

**Washington, D. C.**—Orders have been issued for 855 ft. of eight-inch water main to be laid on Rhode Island ave., and 805 ft. on Dennison st.

**Wilmington, Del.**—Wilmington Water Department has decided to install two water power turbines at city mill pumping station to utilize water power now going to waste.

**Brooksville, Fla.**—J. T. Fuller, of Umatilla, has been granted franchise for large water and electric light plant.

**Freeport, Ill.**—City Council has selected F. B. Turneure, dean of college of engineering of University of Wisconsin, to make appraisal of property of Freeport Water Co. City either will purchase plant or grant company new franchise next year.

**La Salle, Ill.**—Taxpayers will vote on following propositions: No. 1, to appropriate \$32,500 for purchase of present water plant owned by La Salle Waterworks Co.; No. 2, to appropriate \$35,000 to make necessary extension of water mains to Niagara Falls city line and village line at north end. Western New York Water Co. has made proposition to village to furnish filtered water for 3 cents a 1,000 gals., with 33 1-3 per cent. reduction for cash within 10 days, which would make cost to village about 1 cent for each 1,000 gals.

**Evansville, Ind.**—Water main is being planned to give water service from Green River road to Washington and Kentucky aves.

**Madisonville, Ky.**—Plans are being considered for installation of waterworks.

**Covington, La.**—Resolution has been passed for special election to vote on tax of \$65,000 for purpose of building municipal waterworks system.

**Pittsfield, Mass.**—Plans have been made for high pressure water supply, estimated to cost \$40,000.

**Oakland, Md.**—Public Service Commission held meeting and considered application of Mountain Lake Water & Light Co. for permission and approval to exercise franchise granted company by Town Council of Loch Lynn Heights, Garrett County.

**Detroit, Mich.**—Resolution has been passed ordering water main to be extended on Geneva ave.

**Detroit, Mich.**—The \$16,000 bond issue for water extensions to St. Clair Heights has been sold to Matthew Finn. His figure was placed at par value plus premium of \$680.

**Ionia, Mich.**—Council has ordered Water Board to put down 18 additional wells to cost \$10,000 to \$15,000.

**Georgetown, Miss.**—Installation of waterworks system has been voted for.

**Pass Christian, Miss.**—City will sink 4-in. artesian well at intersection of Second st. and Market ave.

**Shubuta, Miss.**—At last meeting of Board of Aldermen election was ordered for Dec. 12 for purpose of floating bonds for erection of a waterworks. Plant is to have a 50,000-gal. tank with an extra reservoir of 75,000 gals. capacity.

**Mountain Grove, Mo.**—Taxpayers are advocating special election for voting on \$25,000 bond issue for construction of municipal waterworks and sewerage system.

**Kalispell, Mont.**—City has decided to purchase present waterworks plant.

**Hastings, Neb.**—Installation of 3,000-gal. pump is urged; estimated cost \$10,000.

**Tecumseh, Neb.**—Bids will be received until 4 p. m. Dec. 18 by City Council for purchase of \$15,000 Water bonds in \$500 denominations. N. M. Davidson, City Clerk; also for \$7,500 Water Extension bonds.

**Cranford, N. J.**—Cranford Township Committee have entered into agreement

with Plainfield-Union Water Co. for supply of water from Netherwood wells.

**Atlantic City, N. J.**—Improvements to City Water Department are proposed by ordinance, introduced in City Council, by which \$100,000 will be expended for sinking of new artesian wells, erection of new pumps and various other extensions of water plant.

**Garwood, N. J.**—Fire and Water Committee of Borough Council held meeting and considered proposed water contract with Plainfield-Union Water Co. Committee decided to recommend to Council that contract be made.

**Laurel Springs, N. J.**—Water company is preparing to extend its service, and has awarded contract for erection of concrete dam of 225,000 gals. capacity for additional storage.

**South Amboy, N. J.**—Definite steps have been taken for erection of standpipe, with capacity of 29,300 gals.; cost \$4,500.

**Jamestown, N. Y.**—Preliminary steps have been taken at meeting of Common Council looking toward erection of duplicate water system in manufacturing section of city for more protection purposes, which would be supplied with water from Chautauqua Lake. Estimated cost \$150,000.

**La Salle, N. Y.**—Taxpayers have voted down four water works propositions.

**Mount Morris, N. Y.**—Special election will be held for purpose of determining whether Trustees of Village shall be empowered to sell bonds in amount of \$95,995, money to be used with \$44,000 now on hand to install municipal waterworks system, obtaining water from Silver Lake, which is 9 miles away. It is estimated that cost to install system would not exceed \$140,000.

**Tonawanda, N. Y.**—Common Council has voted to sell to highest bidder, on Dec. 6, \$150,000 worth of refunding water bonds.

**Cincinnati, O.**—Laying of several lines of water mains has been recommended as follows: Main from Eastern ave. pumping station to Madison road; new 16-in. main in Madison road, from Edwards road to Oakley; a 16-in. main in Mitchell ave., to N. Winton place; 20 and 24-in. main in State ave., from Eighth ave. to the Western Hills pumping station; 10-in. main in Hopple st., from Spring Grove ave. to Western ave., and a 16-in. main in Glenway ave., from Warsaw ave. to Ferguson road.

**Cleveland, O.**—Plans for \$1,500,000 water filtration project are being discussed.

**Dayton, O.**—Ordinance is being considered for issuance of bonds for improvement and extension of waterworks system, to cost \$9,000.

**Amity, Ore.**—Installation of waterworks is being considered.

**Warren, O.**—Voters have authorized \$25,000 bond issue for waterworks.

**Worthington, O.**—Appropriation for \$20,000 has been voted for waterworks plant.

**Dawson, Pa.**—Citizens have voted in favor of issuing \$8,000 of bonds for improvements to water supply system.

**Erie, Pa.**—Board of Water Commissioners have received information from engineering firm of Chester & Fleming that plans for standpipe to be erected near storage reservoir were ready. Engineers are now drawing plans for filtration plant, which is to be erected near pumping station.

**Philadelphia, Pa.**—Installation of meters in establishments which consume unusually large quantities of water is recommended.

**Central Falls, R. I.**—Resolutions have been passed by City Council empowering Committee to make contract for 10-year supply of water for City with City of Pawtucket.

**Brownwood, Tex.**—Bond election which was held was almost unanimous for issuance of bonds for extension of waterworks. Issue was for \$15,000, and is to be used in removing present standpipe and building large reservoir on mountain to southwest of city.

**Cleburne, Tex.**—City Council has ordered bond election for Dec. 30, 1911, for \$128,000 for purpose of purchasing water works system from bondholders and certificate holders, and \$50,000 for purpose of equipping and maintaining system.

**Dallas, Tex.**—Plans have been sub-

mitted Park Board for digging Trinity well at Fair Park, city to pay one-half of cost and Park Board other half. Water Commissioner Nelms has put proposition up to some of members of Park Board, and, he said, these members seem to favor project. The cost of such a well would be about \$25,000 or \$27,000, basing estimate on cost of other similar wells.

**Fort Worth, Tex.**—Commissioner Powell has been authorized to make contract for new supply of iron water meter boxes. Lowest bid received was \$2.50 each, but Mr. Powell said he could obtain them at lower figure, and save from \$700 to \$800 per year.

**Salt Lake City, Utah.**—Construction of large storage reservoir for Water Department is being considered.

**Prosser, Wash.**—Installation of municipal water system has been voted for; estimated cost \$50,000.

**Manitowoc, Wis.**—The State Railroad Commission has ratified agreement between Manitowoc Water Works Co. and City of Manitowoc, whereby city shall purchase the plant for \$247,500. Original price fixed by city was \$236,000.

#### CONTRACT AWARDED.

**Russellville, Ariz.**—For constructing proposed water system, to Towkawa Construction Co., Kansas City, Mo., \$38,893. Other bids as follows: J. A. Pringle, Montgomery, Mo., \$39,819; T. C. Brooks & Son, Jackson, Mich., \$40,071; W. F. Plummer Co., Springfield, Mo., \$40,118; Humphrey & Downer, Hugo, Col., \$40,594; Cook Construction Co., Des Moines, Ia., \$40,703. The contract for wood pipe was awarded to Wyckoff & Son Co., for c. i. pipe, to the American Cast Iron Pipe Co., 718 Scarritt Building, Kansas City, Mo.; for fire hydrants and valves, to the Iowa Valve Co.; for pumps, to Reeves & Skinner Machinery Co.; and for motors, to the Westinghouse Electric & Manufacturing Co.

**Fort Barrancas, Fla.**—To A. M. Lockett & Co., New Orleans, La., at \$9,650, for furnishing pump and other work in connection with power plant at Fort Barrancas.

**Pensacola, Fla.**—To Charles Born, Pensacola, Fla., by Water and Gas Committee of City Council, for laying 26,000 ft. of water mains at 58 cents per lin. ft., and for furnishing all parts, including fire hydrants, at \$24.50 each.

**Port Tampa, Fla.**—By City, to Chester A. McFarland, Tampa, Fla., for laying 6 and 8-in. water mains.

**Bayard, Ia.**—To Des Moines Bridge & Iron Co., of Des Moines, for waterworks for which \$10,500 bonds have been sold.

**Bayard, Ia.**—By City, to Des Moines Bridge & Iron Co., Des Moines, Ia., for constructing water system here, at about \$10,000.

**Mounds, Ill.**—For constructing waterworks, to O'Shea & Hogan, of Cario, Ill., at \$14,580.

**Springfield, Ill.**—By City, for erection of new building at waterworks pumping station, to W. M. Allen, Son & Co., of Peoria, at \$47,866. The Fitzsimmons-Wheeler Construction Co. was next lowest bidders, at \$49,050.

**Springfield, Ill.**—For supplying pipe and valves needed at waterworks in connection with new pumping station, to Darby Pump Co., of York, Pa., at \$2,990.

**Springfield, Ill.**—By City, to W. M. Allen Son & Co., Peoria, Ill., for constructing two-story pumping building, 123 x 149 ft., including a pump pit, 50 x 90 x 20 ft., at \$47,866.

**Boston, Mass.**—For laying 1,100 ft. of 8, 10 and 12-in. water pipe in various streets, to Michele de Sisto.

**Pacific, Mo.**—By Council, for new waterworks, to James A. Prendle, of Montgomery City, at \$12,940. This does not include engines, pumps, hose, etc.

**Briggs, Okla.**—By Board of Town Trustees, for construction of system of water works, to N. S. Sherman Machine & Iron Works, Oklahoma City, Okla., at \$17,702. Other bids were as follows: J. S. Terry Construction Co., Poteau, Okla., \$18,425; Oklahoma Engineering Co., Oklahoma City, \$19,440; Hoff & Williams, Muskogee, \$20,176.

**Fryer Creek, Okla.**—For 33,000 lin. ft. of 10-in. Class "B" c. i. water pipe, from plans of the Benham Engineering Co., American National Bank Building, Oklahoma City, to American Cast Iron Pipe



Co., at \$26.50 per ton, or a total of \$30,316; contract for lead and yarn was awarded to Crane Co., for \$2,476.

**Columbia, S. C.**—By Council, for construction of six blocks of water mains and six blocks of sewerage mains, to Columbia Concrete Co., at \$5,300.

**Honea Path, S. C.**—By Board of Public Works, to Cothran & Cothran, Greenwood, S. C., for construction of water works system and electric light plant. Estimated cost \$50,000.

**Jellico, Tenn.**—For construction of waterworks, to Howard Neely, of Mt. Pleasant.

**Trenton, Tenn.**—For constructing electric light system and water works improvements, consisting of one 100-kva. generator, engine type, high-speed automatic engine, 150 hp. R. T. boiler, a 150-hp. heater, deep-well pump for 10-in. well, 150,000-gal. reservoir, 500 ft. 8-in. c-i. water pipe, 350 ft. 10-in. supply main, 200 poles, 60,000 ft. waterproof, triple braid, No. 6 wire, to Allen Engineering Co., of Memphis, for total of \$17,234.

**Union City, Tenn.**—For constructing waterworks, to Craig & Fisher, of Covington, Tenn., for about \$18,000.

**Temple, Tex.**—By Board of Water Commissioners, for furnishing horizontal, duplex, triplex expansion condensing pumping engine of easy capacity of 3,000,000 gals. in 24 hrs., to Allis-Chalmers Co., of Milwaukee, Wis., for \$12,690.

## LIGHTING AND POWER

**Los Angeles, Cal.**—Finance Committee will receive bids for \$6,500,000 power and harbor bonds on Feb. 15.

**San Francisco, Cal.**—Illuminating and decorating of Mission st., from 16th to 24th sts., has been decided on.

**Santa Ana, Cal.**—At conference between committee composed of three City Trustees and another committee representing Merchants' & Manufacturers' Association, Trustees agreed to work out plan by which cluster lights will be set up on all business streets of this city.

**Visalia, Cal.**—Installation of street lighting system is being planned.

**Willimantic, Conn.**—Resolution has been adopted providing for Committee to enter into new 3-year contract with Willimantic Gas & Electric Light Co., for city lighting.

**Brooksville, Fla.**—J. T. Fuller, of Umatilla, has been granted franchise for large electric light and water plant.

**Harvey, Ill.**—The Harvey Tribune-Citizen is endeavoring to interest business men on subject of ornamental street lighting for business section of city.

**Geneva, Ill.**—Improvements will probably be made to electric light plant. Equipment for new 33-cycle system will be installed.

**La Salle, Ill.**—Taxpayers will vote on following propositions: To appropriate \$30,000 for establishment of complete municipal lighting plant. At present city is lighted from plant owned by Niagara Falls Gas & Electric Light Co., but company has made no offer to sell it to village.

**Springfield, Ill.**—Ordinance has been passed by Park Board, which provides for purchase of Fourth st. lighting system.

**Chicopee, Mass.**—Board of Aldermen have voted in favor of bond issue of \$96,000 for reconstruction of municipal electric light plant.

**Bay City, Mich.**—Electric Light Committee is planning to change electric decorations at Center and Washington aves.

**Detroit, Mich.**—Resolution has been passed for placing lights on Hamilton boulevard at intersections of Florence and Second aves.

**Standish, Mich.**—C. F. Hall has purchased electric light plant and waterworks, and has asked City Council for 10-year franchise for city lighting and pumping.

**Duluth, Minn.**—Proposed bond issue and municipal light question are being discussed.

**Foley, Minn.**—Franchise has been granted to Battery Co., of Milwaukee, Wis., to install electric light plant here.

**Virginia, Minn.**—By vote of 529 to 96 a special municipal election electors of Virginia instructed City to proceed to

acquire by purchase or condemnation proceedings, water and light plant of Virginia Electric Power & Water Co., and operate it if it can be secured for reasonable price.

**Hastings, Neb.**—Directors of Chamber of Commerce have voted to accept proposition of City Council for installation of ornamental lighting system in downtown section, and appointed committee to enlist co-operation of business men.

**Kearney, Neb.**—Question of lighting city streets on new cluster light system is being discussed by City Council. Motion was voted to submit proposition to vote \$40,000 bonds for installing and operating of municipal system.

**Perth Amboy, N. J.**—Improvement of electric lighting is being discussed for Smith st., between State st. and Madison ave.

**Fallon, Nev.**—City is soon to own and operate its electric light plant. Plans and specifications for same have been accepted by City Council, and Council has authorized selling of \$15,000 in bonds for construction of same. Current is to be secured from Government plant at Lahontan, but city has to build power line and distributing system.

**Willard, N. M.**—Installation of electric power plant is under consideration to supply electricity for irrigation purposes. Cost is estimated at \$125,000.

**Le Roy, N. Y.**—Franchise has been granted to Le Roy Hydraulic Electric Gas Co., by Town Board, to construct, maintain and operate necessary poles, towers, wire cables, etc., for purpose of distributing electricity for light, heat and power.

**Dayton, O.**—Ordinance is being considered for issuance of bonds in sum of \$30,000, for purpose of supplying light to city.

**Toledo, O.**—Ordinance has been passed for electric lighting of Delaware and Trenton aves.

**Boyersford, Pa.**—Citizens have voted for loan of \$30,000, to erect electric light plant.

**Sharon, Pa.**—Citizens are in favor of installing municipal electric plant.

**Dallas, Tex.**—Ornamental lighting system for Houston st., from Commerce st. to Dallas-Oak Cliffe viaduct, is being discussed.

**Tremonton, Utah.**—Residents are discussing installation of electric lights.

**Danville, Va.**—Bonds in sum of \$180,000 have been sold to Equitable Life Assurance Society, and funds will be used for erection of up-to-date electric light plant and street improvements.

**Ephrata, Wash.**—Ephrata Electric Co. is being formed for purpose of furnishing electric light for this city. Company has capital of \$10,000, and will incorporate and proceed to install plant.

**Sultan, Wash.**—Municipal electrical distributing system is being considered.

**Kaukauna, Wis.**—Nine street arches, to be lined with small electric lights, will be placed along Main ave. and Second st.

**Two Rivers, Wis.**—City Council is considering question of increasing capacity of water and light plant, at cost of \$25,000.

## CONTRACTS AWARDED.

**Tulare, Cal.**—To Oscar Parlier, for brick and cement work on new power house for Tulare County Power Co. Construction work laid out by this company calls for investment of \$250,000.

**Fort Dade, Fla.**—For putting in pumps for electric plant to A. M. Lockett Co.

**Fort Dade, Fla.**—For installing new set of boilers to operate electric light plant and water supply of reservation, to E. Keller Co., of Williamsport, Va., at \$5,000. A. M. Lockett Co., of New Orleans, bid \$7,000.

**Pocahontas, Ia.**—To Dwyer, Field Co., 681 Endicott Building, St. Paul, Minn., at \$30,000, for construction of electric lighting plant at Pocahontas.

**Boston, Mass.**—For installing boiler in power house at Consumption Hospital, to Pierce & Co., 143 Kingston st., for \$2,847.

**Muskegon, Mich.**—By City Council, to Grand Rapids-Muskegon Power Co., to furnish city with light, and it is said that no municipal lighting plant will be constructed for the present.

**St. Joseph, Mo.**—By Council, for laying of cable of extension of White way, to

Dubois Construction Co., at \$0.4884 per lin. ft.

**Albany, N. Y.**—To Capital City Construction Co., of Albany, for electric wiring State Hall, at \$2,844.

**North Rose, N. Y.**—By city, for electric light system to be established from Wolcott to Alton, and from Sherman's Corners to Rose, to O. M. Curtis, of Wolcott.

**Syracuse, N. Y.**—For installing steam-heating pipe and radiators in new Corner's Building, as follows: Thomas E. Gildea, \$1,169; William George Co., \$1,995; Dennis R. McCarthy, \$1,950; Frank Leavary, \$1,635; E. P. Bates, \$1,485; Burns Bros., \$1,879; William B. Goldie, \$1,917; Young & Power, \$1,948; William P. Murphy, \$2,157.

**Ward's Island, N. Y.**—For new engine and generator at Manhattan State Hospital, Ward's Island, to Frost & Sheldon, of Albany, for \$6,285.

**Columbus, O.**—For addition to municipal light plant, to D. W. McGrath, for \$5,294.

**Birdsboro, Pa.**—By City, for new gas plant, to John W. Slipp.

**Burlington, Vt.**—By Electric Light Commissioners, for furnishing new turbine generator and condenser for municipal plant, to Westinghouse Electric Mfg. Co., at \$20,500.

**Sedro-Woolley, Wash.**—By State Board of Control at Olympia, for work at Northern Hospital for Insane at Sedro-Woolley, as follows: To Eckhart Heating & Plumbing Co., of Seattle, for power plant, at \$34,920; Puget Sound Bridge & Dredging Co., Seattle, was lowest of eight for construction of power house, at \$15,425, and to Standard Engineering Co., of Seattle, for electrical work, at \$2,650.

**Milwaukee, Wis.**—For condenser for power plant for refuse incinerator, to Westinghouse Electric Co., and for turbine and auxiliary apparatus, to Allis-Chalmers Co., total cost, \$15,092.

## FIRE EQUIPMENT

**Lodi, Cal.**—City has decided to have modern fire department. A citizens' committee has recommended that town be divided into four fire districts for fire alarm purposes, and if present plans do not miscarry, apparatus costing about \$5,000 will be purchased and building put up to house it.

**Hugo, Colo.**—City will probably purchase 1,000 ft. of new fire hose.

**Fairfield, Conn.**—Four hundred feet of hose will probably be purchased for fire department.

**Hartford, Conn.**—Question of automobile propeller for Company No. 6 was discussed, and Commissioners decided that new equipment was necessary.

**Hartford, Conn.**—New fire headquarters' building will be erected at 275 Pearl st.

**Hartford, Conn.**—Installation of fire-alarm system in new fire headquarters, at cost of \$25,000, is being considered.

**Rockville, Conn.**—Fire Committee recommends appropriation of \$10,000, for new engine house in Prospect st.

**Newcastle, Del.**—Purchase of chemical engine is being discussed.

**Jacksonville, Fla.**—It is stated that entire equipment at present in use at central fire station will be transferred to other stations, and entirely new apparatus will be installed at headquarters, all of which will be propelled by motor power.

**Summerville, Ga.**—Erection of fire house has been authorized.

**Quitman, Ga.**—Ordinance has been passed providing for bond issue of \$75,000; \$12,000 of this amount will equip fire department.

**Mason City, Ia.**—Voters have decided in favor of bond issue for erection of new fire barn, to cost \$25,000.

**Chicago, Ill.**—Residents of Edgewater district are petitioning for better police and fire protection.

**Peoria, Ill.**—Installation of automobile vehicle, with ladders, hose and engine, for No. 3 engine house on West Bluff, is being considered.

**Fort Wayne, Ind.**—Organization of flying squadron, to be equipped with fast automobile, is being discussed by Board of Public Works.

**Muncie, Ind.**—Installation of motor fire equipment is being considered.

**Hutchinson, Kan.**—Ordinance is being considered providing for special bond issue of \$20,000 for new fire station and improvement of present equipment.

**Hutchinson, Kan.**—Ordinance has passed second reading providing election for purpose of voting bonds for improving of fire department.

**Louisville, Ky.**—Bids will be received by Board of Public Works, for erection of 50 fire hydrants in various parts of city.

**Hull, Mass.**—Erection of new central fire station has been decided.

**Lowell, Mass.**—Order has been referred to Finance Committee for appropriation of \$9,500 for another chemical engine.

**Medford, Mass.**—Purchase of auto engine is being discussed.

**Medford, Mass.**—Purchase of auto engine, auto chemical and hose wagon is favored by Mayor.

**Pigeon Cove, Mass.** (P. O. Rockfort)—Installation of better fire alarm system is being discussed.

**Taunton, Mass.**—Committee on Finance has voted to receive bids for proposed new motor combination truck for fire department.

**Wakefield, Mass.**—Appropriation of \$2,000 has been voted for fire alarm improvements.

**Wellesley, Mass.**—Fire department is in need of fire hose.

**Houghton, Mich.**—Fire Chief recommends purchase of additional hose wagon.

**Ishpeming, Mich.**—Erection of new fire station has been authorized, to be equipped with modern apparatus.

**Pontiac, Mich.**—City Commission have received bids for furnishing city with 1,000 ft. of fire hose. There were seven bids, prices ranging from 85 cents to \$1.10 per ft., and action was deferred one week.

**North Mankato, Minn.**—Installation of fire-alarm system is being considered.

**Duluth, Minn.**—Board of Fire Commissioners has awarded contracts for 4,000 ft. of hose to several local concerns. Total cost of hose will be \$3,900. Board decided to advertise for site for new fire hall on West Third st., between 33d and 36th aves. Bids for new signal system will shortly be opened.

**Dakota City, Neb.**—City is contemplating purchase of additional fire apparatus.

**Jersey City, N. J.**—Erection of fire house at Johnson and Manning aves. is recommended.

**Weehawken, N. J.**—Township Committee has voted to purchase electric truck for fire department, at cost of \$9,000.

**Canandaigua, N. Y.**—Town will purchase 2,000 ft. of fire hose.

**Rochester, N. Y.**—New fire house will be erected in 10th Ward on plot bounded by Dewey ave., Pierpont and Bryan sts.

**Rochester, N. Y.**—Bids will be advertised for installation of fire-alarm system in Eighth Ward.

**Watervliet, N. Y.**—Purchase of steam fire engine and additional hose is being discussed.

**Canton, O.**—City is considering purchase of new auto fire truck.

**Cleveland, O.**—Auto fire engine to cost \$8,500 will be purchased by Borough Council of East Cleveland.

**Lorain, O.**—Bids will be advertised for 1,500 ft. of fire hose.

**Massillon, O.**—Fire chief has recommended purchase of four auto fire engines.

**Toledo, O.**—We are informed that bids given on page 649, issue of Dec. 15, on 2,000 ft. of hose as follows: Eureka hose, \$1.15, and Paragon hose, \$1.05, were for hose without couplings. Regular price of Eureka hose is \$1.20, and Paragon hose \$1.10.

**Chambersburg, Pa.**—Purchase of fire hose is being considered.

**Ellwood City, Pa.**—Bond issue for building and equipping of fire house has been approved of.

**Lebanon, Pa.**—Committee has been appointed to purchase hose and chemical wagon.

**Philadelphia, Pa.**—Board of Trade recommends installation of motor fire engines.

**Washington, Pa.**—Appropriation of \$8,000 has been made for purchase of latest auto fire truck and for enlarging quarters of fire department.

**Johnston, R. I.**—Board of Governors of Hose 3, Johnston Fire Department, held meeting for purpose of considering preliminary plans for erection of new fire station, and also settling a date for mass meeting in Lincoln school house.

**Charleston, S. C.**—Authorities of fire department are considering installation of new combination fire apparatus.

**Greensboro, S. C.**—Purchase of two motor hose wagons for local department is being considered.

**Abilene, Tex.**—Purchase of auto for fire department is being considered.

**Bay City, Tex.**—City will purchase 100 ft. of fire hose.

**Orange, Tex.**—Council has authorized purchase of 1,000 ft. of 2½-in. regulation rubber hose.

**Sherman, Tex.**—Election will shortly be held for voting on bond issue for purchase of auto fire engine.

**Pasco, Wash.**—Council is considering purchase of fire engine for city.

**Manitowoc, Wis.**—Council has been recommended to purchase motor apparatus.

#### CONTRACTS AWARDED

**Waterloo, Ia.**—By Council, to Seagrave Co., of Columbus, O., at their bid of \$2,500.

**Aurora, Ind.**—For 800 ft. of "Boston Special" fire hose, to Boston Woven Hose & Rubber Co., through its representative, J. E. Larkin, of Dayton, O.

**Olathe, Kan.**—By City Council, to Anderson Coupling & Fire Supply Co., of Kansas City, Kan., for furnishing 1,100 ft. of fire hose costing 76 cents per ft.

**Ventnor City, N. J.**—By City, to Robinson Fire Apparatus Manufacturing Co., of St. Louis, Mo., for one "Jumbo" auto fire engine.

**Louisville, Ky.**—To Harry I. Wood Co., for electrical work in connection with installation of new fire alarm system in City Hall. F. S. Schardein & Sons Co. was awarded contract for steam heating system.

**East Liverpool, O.**—To Robinson Fire Apparatus Mfg. Co., for furnishing a "Jumbo" auto engine.

**Albuquerque, N. M.**—For furnishing auto combination fire engine and hose wagon, to American-La France Fire Engine Co., 95 hp., f. o. b. Albuquerque. Other bids as follows: Vector Motor Truck Co., of Buffalo, N. Y., 6-cyl. 100-hp. combination engine, \$1,200 f. o. b. Buffalo; Graham Motor Co., of Los Angeles, Cal., \$11,250 f. o. b. Albuquerque; Waterous Engine Works Co., of St. Paul, Minn., 101-hp. combination engine and hose wagon, \$8,775 f. o. b. Albuquerque; Robinson Fire Apparatus Co., St. Louis, Mo., 120-hp., \$9,000, second bid 80-hp. combination wagon, \$7,475 f. o. b. Albuquerque.

**Lockland, O.**—By City, to J. E. Larkin, representing Boston Woven Hose & Rubber Co., for 400 ft. of "Falcon" brand knitted fire hose.

**Lorain, O.**—By Board of Control, to Boston Woven Hose & Rubber Co., for 1,000 ft. of "Boston Fire Jacket" brand.

#### BRIDGES

**Fort Wayne, Ind.**—Construction of bridge over St. Mary's River at Harrison st. is being discussed.

**Tampa, Fla.**—City Engineer has been instructed by Board of Public Works to prepare estimate of cost of putting in cement pier at east span of Fortune st. bridge.

**Saginaw, Mich.**—City Engineer will prepare plans for construction of pile trestle bridge, about 156 ft. long, between proposed pier No. 5 of Johnson st. bridge and proposed 600 ft. dock line on westerly bank of river; estimated cost \$3,000.

**Vassar, Mich.**—Township has decided to build new bridge to replace old one across Cass River.

**Scottsbluff, Neb.**—At recent election bonds were voted in Highland and Cas-

tle Rock precincts for new Platte river bridge at McGrew.

**New Brunswick, N. J.**—Drawbridge will be erected over Cheesequake Creek.

**Trenton, N. J.**—Issuance of bonds amounting to \$25,000 have been authorized for following improvements: Yardville and Allentown road, McGovern Construction Co., \$18,000; Stockton st. bridge and bridge near the Reed farm, in Ewing Township, McGovern Construction Co., \$3,000; bridges on the Lawrenceville road and in Hopewell, Russell Klockner, \$4,000.

**Buffalo, N. Y.**—Mayor Fuhrmann has approved Common Council's action accepting plans of Nickel Plate and Buffalo Creek railroads for bascule bridges across Buffalo River, in connection with river improvement work. Two bridges are of about same size. Fixed spans will be about 62.5 ft. long, and lift spans about 100 ft.

**Cincinnati, O.**—Bid of \$12,115, by T. J. McKim, for work on bridge to be built over Mill Creek at Second ave., Carthage, was reported to be lowest.

**Cincinnati, O.**—Bids for construction of Ludlow ave. viaduct are being received; estimated cost \$325,000.

**Chillicothe, O.**—Bids will be received until 12 noon Jan. 8, 1912, at office of Auditor of Ross County, for purchase of \$22,000 Bridge bonds. Robert D. Alexander, Auditor.

**Dayton, O.**—Ordinance has been passed to issue and sell bonds for re-erection of bridge across Hydraulic at Sperling ave., at cost of \$2,000.

**Conshohocken, Pa.**—County Commissioners are considering building bridge over Pennsylvania Railroad tracks and the Schuylkill River. Estimated cost is \$250,000.

**Wilkes-Barre, Pa.**—Immediate steps will have to be taken for repairing of South st. bridges.

**Dallas, Tex.**—Merlin st. has been selected as location for viaduct to be built across Santa Fe Railroad tracks by that railroad company has been announced by J. E. Lee, City Commissioner of Streets. Viaduct will cost approximately \$30,000, and City will build approaches.

**Tacoma, Wash.**—City Engineer W. C. Raleigh has been instructed by Municipal Commission to provide in modified plans for approach of 14th st. bridge, from A st., an opening in abutment wall on Cliff ave., so that in future city could utilize space beneath approach and between Cliff ave. and A st.

#### CONTRACTS AWARDED

**Pine Bluff, Ark.**—To Strauss Bascule Bridge Co., Chicago, Ill., and Romheld Construction Co., of Chicago, joint proposal offering to construct proposed free bridge over Arkansas River, for \$675,000.

**Los Angeles, Cal.**—By Board of Public Works, to Mercereau Bridge & Construction Co., 659 Pacific Electric Building, city, at \$7,490, for construction of trestle bridge in East Seventh st., between End and Schley sts., in Wilmington District.

**La Junta, Col.**—For erecting bridge over Arkansas River, to Pueblo Bridge Co., Pueblo, for about \$50,000.

**Jacksonville, Fla.**—For furnishing material and constructing Duval County half of bridge contemplated over Nassau River on Duval road, to Logan Concrete Engineering Co., of Jacksonville.

**Aurora, Ill.**—To J. E. Salfsberg & Co., for filling in concrete piers of Illinois ave. bridge.

**Galesburg, Ill.**—By Board of Commissioners of Knox County, to Decatur Bridge Co., Holmes Building, Galesburg, for construction of three bridges in Persifer Township.

**Boston, Mass.**—By Commissioner Public Works, for constructing draw span pile bridge, etc., of Meridian st., bridge over Chelsea Creek, East Boston to Chelsea, to Lawler Bros., 16 City sq., Charlestown, for \$122,180.

**Saginaw, Mich.**—For construction of substructure for proposed Johnson st. bridge, Saginaw, Mich., to N. Sager, Whitney & Wells, at their bid of \$35,354.

**Vicksburg, Miss.**—By City Council, to concur in action of Board of Supervisors in letting contract for constructing concrete arch bridge over Glass Bayou, to Roberts Construction Co., at \$14,999.



**Woodbury, N. J.**—By Board of Gloucester County Freeholders, for construction of bridge over river at Mt. Royal, to Owego Bridge Co., Owego, N. Y., at \$7,169.

**Cincinnati, O.**—For construction of culvert in Sycamore ave., at Rossmoyne, to A. H. Doehel, at \$1,095.

**Springfield, O.**—By Board of Commissioners of Clark County, for construction of bridge in Bethel Township, as follows: Superstructure, to Home Engineering Co.; Courtland Hotel Building, Canton, O.; reinforced concrete work and abutments, to Patrick McCaffrey, Springfield.

### MISCELLANEOUS

**Los Angeles, Cal.**—Finance Committee will receive bids on Feb. 15 for \$6,500,000 harbor and power bonds.

**San Francisco, Cal.**—Plans for construction of pier 27 at foot of Union st., have been approved of by State Board of Engineering, and bids for same will be advertised immediately.

**Jacksonville, Fla.**—Board of Public Works has let contract for bulkheading on river front at Whiting st., to cost \$3,217.

**Jackson, Ga.**—Recent issue of \$12,000 City Improvement bonds has been sold to First National Bank for \$12,150.

**Evansville, Ind.**—Erection of public comfort station at Fourth and Main sts. is being discussed.

**Greenville, Ky.**—Muhlenberg County has appointed committee to consult architects and get estimates for new jail to cost \$15,000.

**New Bedford, Mass.**—City Council Committee on Finance has awarded \$28,000 bond issue to Blodgett & Co., highest bidders.

**Glen Ridge, N. J.**—Plans are being made for improvements and developments which would connect Glen Ridge with Eagle Rock and Branch Brook parks.

**Cleveland, O.**—Ordinance has been passed to authorize Board of City Hall Commissioners to expend a sum not in excess of \$1,100,000 for superstructure of new City Hall.

**Newport, R. I.**—Newport Representative Council has voted to place before voters on Dec. 5 proposition to secure \$30,000 for projected improvements at Easton's Beach.

**Petersburg, Va.**—Finance Committee

has completed work of itemizing appropriations to be made out of proposed bond issue of \$165,000.

**Port Wing, Wis.**—Appropriation of \$10,000 has been recommended for improvement of harbor.

### CONTRACTS AWARDED.

**Clifton, Ariz.**—To Otto P. Kroeger, of San Antonio, Tex., to erect Greenlee County Court House, for \$43,000.

**Robinson, Ill.**—For erection of jail and sheriff's residence, to A. E. Kemmer, Lafayette, Ind., at \$19,300; cell work, to Champion Iron Co., Kenton, O., \$6,000; heating, plumbing and electric wiring, to Ernst W. Evans, Robinson, \$2,845.

**Duluth, Minn.**—To Jacobson Bros., 501 Columbia Building, for erecting public library, for \$14,681.

**Manchester, O.**—To McNeil & Master-son, of Manchester, to erect State Armory, at \$17,140.

**Claude, Tex.**—For erection of three-story brick and stone semi-fireproof court house from plans of Elmer G. Withers, of Stamford, to L. R. Wright & Co., of Dallas, for \$48,764.

## TOO LATE FOR CLASSIFICATION

### BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>STREET IMPROVEMENTS</b>				
Canada.....	Oshawa.....	Dec. 9, 5 p.m.....	Const. 11,000 yds. asph. block pav't with cement curb & gutter	W. E. N. Sinclair, Mayor.
Kentucky.....	Louisville.....	Dec. 11, 2 p.m.....	Improving a number of roads.....	R. G. McGrath, Sec'y Bd. Pub. Wks.
New York.....	New York.....	Dec. 13, 11 a.m.....	Paving with second-hand granite.....	A. E. Steers, Pres. Boro. Brooklyn.
Kentucky.....	Louisville.....	Dec. 15, 2 p.m.....	Paving several streets with brick.....	R. G. McGrath, Sec'y Bd. Pub. Wks.
Ohio.....	Belle Valley.....	Dec. 19, noon.....	Paving 4,580 ft. road with brick (readvertisement).....	S. S. Barnhouse, Township Clerk.
Canada.....	Lethbridge, Alta..	Dec. 27.....	Constructing pavements, several streets.....	A. C. D. Blanchard, City Engr.
<b>SEWERAGE</b>				
New Mexico....	Las Cruces.....	Dec. 15, 2 p.m.....	Constructing sewer system.....	R. L. Young, Town Clerk.
Canada.....	Lethbridge, Alta..	Dec. 27.....	Constructing sewerage disposal plant.....	A. C. D. Blanchard, City Engr.
<b>WATER SUPPLY</b>				
Canada.....	Moose Jaw, Sask..	Dec. 12.....	Furnishing 100,000 ft. 18-in. steel water pipe.....	W. F. Heal, City Clerk.
New York.....	New York.....	Dec. 13, 3 p.m.....	Furnishing water supply for comfort station in Central Park	C. B. Stover, Pres. Park Comm.
New Mexico....	Las Cruces.....	Dec. 15, 2 p.m.....	Constructing water system.....	R. L. Young, Town Clerk.
<b>BRIDGES</b>				
Missouri.....	Warrensburg.....	Dec. 12.....	Constructing 12 bridges across drainage ditch.....	R. J. Grover, Ass't Sec'y.
Ohio.....	Massillon.....	Dec. 15, 10 a.m.....	Constructing Strauss trunion bascule lift bridge.....	J. H. McConnell, County Auditor.
Texas.....	Houston.....	Dec. 18, noon.....	Constructing 2 reinforced concrete bridges.....	H. B. Rice, Mayor.
New Jersey....	New Brunswick..	Dec. 18, 2 p.m.....	Constructing drawbridge over creek.....	Board of Freeholders.
<b>FIRE EQUIPMENT</b>				
New York.....	New York.....	Dec. 11, 10 30 a.m..	Constructing 4 fire houses.....	Jos. Johnson, Fire Comm.
Rhode Island..	Providence.....	Dec. 13, 2 15 p.m.....	Furnishing 2 steam fire engine boilers.....	Henry Fletcher, Mayor.
Ohio.....	Marion.....	Dec. 14, noon.....	Building central fire station.....	J. A. Knapp, Dir. Pub. Safety.
New Jersey....	Newark.....	Dec. 18, 8 30 p.m.....	Constructing central fire station, also apparatus house.....	F. J. Fischer, Chm. Com. Pub. Bldgs.
California.....	Los Angeles.....	Dec. 19, 11 a.m.....	Furn. 10,000 ft. 2½-in. cotton rubber lined fire hose.....	City Clerk.
<b>MISCELLANEOUS</b>				
New Jersey....	Jersey City.....	Dec. 11, 2 p.m.....	Furnishing compressed cork or other tiling for court house.	J. C. Treacy, Sec'y and Comm.
New Jersey....	Newark.....	Dec. 12, 3 15 p.m.....	Grading and draining training field.....	R. D. Argue, Sec'y Bd. Education.
New York.....	New York.....	Dec. 14, 3 p.m.....	Furnishing 2 gasoline motor road rollers.....	Comm. Parks, Chas. B. Stover, Pres.
Pennsylvania..	Philadelphia.....	Dec. 19, 1 p.m.....	Furn. playground materials and general supplies for schools.	A. F. Hannon, Supt of Supplies.

### STREET IMPROVEMENTS

**Fernandina, Fla.**—Bids will be received until 10 a. m., Dec. 27, by Board of County Commissioners of Nassau County, for purchase of \$60,000 road and bridge bonds. W. Theo. Waas, Chairman Board of County Commissioners.

**Tallahassee, Fla.**—Voters have decided in favor of \$50,000 bond issue for construction of paved highway from business district of city to passenger stations of Seaboard Air Line Railway.

**Michigan City, Ind.**—Petition has been submitted to Board of Public Works asking for paving of Lafayette st., from 10th st. to Barker ave.

**Michigan City, Ind.**—City Engineer has reported to Board of Public Works his estimates for construction of pavements as follows: Spring st., Detroit to Wood, \$2,200; Wabash st., Barker ave. to Earl road, \$17,000; Baltimore st., Michigan to railroad, \$60,500; Detroit st., Spring to Lafayette, \$3,100; Pearl st., small strip, connecting with Detroit st., \$2,750.

**Baltimore, Md.**—City is planning straightening of streets and other improvements.

**Flint, Mich.**—Resolutions approving proposition to bond county for \$500,000

for good roads and commending use of wide tires for wagons drawing heavy loads have been passed by Genesee County Pomona Grange.

**Youngstown, O.**—Ordinance has been passed authorizing bond issue of \$5,000 for extension of Steel st.

**Galveston, Tex.**—Ordinance has been adopted for paving of alleys with brick in downtown districts.

### CONTRACTS AWARDED

**Elizabeth, N. J.**—By Township Committee, to grade around new Town Hall, to Fred McGilveay, at \$1,000.

**Everett, Wash.**—For opening and clearing and grading of 2¼ miles of Pilchuck road, to Reinseth Bros., at \$10,405.

### SEWERAGE

**Winston-Salem, N. C.**—Election will be held Dec. 26 by Winston-Salem citizens for voting on appropriation for improvements in sewer and street systems.

**Binghamton, N. Y.**—Meeting of Board of Estimate and Apportionment will probably be called for purpose of approving ordinance passed by Common Council authorizing city officials to issue

city notes for \$6,000 for purpose of paying city's share of sewer construction.

### CONTRACTS AWARDED

**Bridgeport, Conn.**—For extending sewer emptying into Pequonnock River, below Berkshire bridge, to Toole & Sunderlin, at \$3,400. B. D. Pierce, Jr., Co. bid \$3,700.

**Bridgeport, Conn.**—By Sewer Commission, for construction of new Brooklawn sanitary sewer, to Strenli & Puckhafer, at \$4.35 a ft. for 30-in. sewer, and \$2.69 per ft. for 24-in. sewer.

### WATER SUPPLY

**Lexington, Ky.**—Two million dollar mortgage has been filed in County Clerk's office to raise revenue for extensive improvements in local water works system.

**Appleton, Wis.**—City will purchase plant of Appleton Water Works Co. for \$255,000.

### CONTRACTS AWARDED

**Boise, Idaho.**—To Slick Bros. Co., Boise, for installing pumping plant and for construction of 25 miles of canal for Kuhn Bros

**Haines, Ore.**—To G. H. Sutherland, Walla Walla, Wash., for construction of water works system.

### LIGHTING AND POWER

**Berkeley, Cal.**—City Council is considering installation of municipal lighting plant.

**Oroville, Cal.**—Plans are being prepared for enlargement and improvement of gas system.

**Baraga, Mich.**—Common Council has decided to submit to vote proposition to bond municipality for \$30,400 for purpose of installing light and water systems.

**Two Harbors, Minn.**—City Council is discussing purchase of new electric unit for water and light plant.

### CONTRACTS AWARDED

**Omaha, Neb.**—By County Commissioners, for lighting fixtures in new county building, to Hayden Bros., at \$25,000.

**Kings Park, N. Y.**—By State Commission in Lunacy, Albany, N. Y., to W. B. Armstrong, Albany, for three water tube boilers for Kings Park State Hospital, Kings Park, at \$28,646.

### FIRE EQUIPMENT

**Cedar Rapids, Ia.**—Purchase of hose for fire department is being considered.

**Richmond, Ind.**—Specifications for new combination hose and chemical wagon, for which appropriation was made, are being prepared by City Clerk and Fire Chief Edgar E. Miller. Specifications will be sent to number of manufacturing concerns for bids. New wagon, when purchased, will be placed at No. 3.

**Boston, Mass.**—Mayor has approved of order adopted by City Council providing for \$5,000 for extension of fire alarm service into Hyde Park.

**Jersey City, N. J.**—Jersey City Fire Commissioners have decided to reject all bids received for furnishing of 60-hp. auto for use of chief engineer and to readvertise for bids for 40-hp. vehicle, it having been agreed that machine of latter power will be sufficient for use of department.

**Rochester, N. Y.**—At meeting of Board of Estimate and Apportionment purchase of fire house site at northwest corner of Driving Park ave. and Bryan st. was approved.

**Akron, O.**—Purchase of motor truck is recommended.

**Youngstown, O.**—Finance Committee is considering improvements to fire department.

**Orange, Tex.**—City Council has authorized purchase of 10,000 ft. of hose.

**North Yakima, Wash.**—Automobile fire apparatus has been ordered for city at cost of \$13,000.

### CONTRACTS AWARDED

**Binghamton, N. Y.**—By Board of Contract and Supply, to supply fire alarm cable for municipal conduit system, to O'Kenite Co., at \$3,121. Other bids as follows: National India Rubber Co., \$3,125.79; J. A. Robeling Sons, \$3,350.58; Standard Underground Cable Co., \$3,300.

**Elm Grove, W. Va.**—By Committee of the Elm Grove Volunteer Fire Company, for building hook-and-ladder truck, to John Robinson. Truck is to be completed before first of year.

### BRIDGES

**Willows, Cal.**—Supervisors have approved plans and specifications prepared by County Engineer Stiles for Nye bridge at Athena; 200-ft. bridge across Angel slough, near Butte City, in Supervisor Wylie's district; three culverts on Norman-Willows road in Supervisor Stanton's district, and culvert in Supervisor Eibe's district, between Willows and gravel pit.

**Fulton, N. Y.**—Specifications for proposed Broadway steel-concrete bridge state that bridge will have six arches, and will be 904 ft. long, with width of 34 to 40 ft. Bids will be received until Dec. 18.

**Youngstown, O.**—Bond issue of \$1,000 is recommended for repairing East Federal st. bridge.

**Allentown, Pa.**—City Council has passed finally ordinance providing for \$500,000 bridge across ravine between Allentown and South Allentown.

**Meadville, Pa.**—Bids are being advertised for strengthening of Mead ave. bridge.

**Pittsburgh, Pa.**—Bids will be received until 11 a. m., Dec. 11, by County Controller, for purchase of \$1,550,000 bridge bonds. R. J. Cunningham, County Controller.

**Florence, S. C.**—Surveys are being made for erection of causeway and bridge across great Pee Dee River and swamp.

### CONTRACTS AWARDED

**Ansonia, Conn.**—To O'Brien Construction Co., 576 Morris Park ave., New York, for construction of concrete arch bridge over Naugatuck River and western division of New York, New Haven & Hartford R. R., at Bridge st. Structure will be 60 ft. wide, about 600 ft. long, and will cost approximately \$130,000. Railroad company will bear part of expense.

**Stamford, Conn.**—For construction of concrete bridge, to O'Connor Concrete Construction Co., Stamford, Conn., at \$13,990.

**Petersburg, Ind.**—For construction of Pottersville bridge across east fork of White River, to Vincennes Bridge Co., Vincennes, Ind., at \$16,444.

**Boston, Mass.**—By Department of Public Works, for rebuilding piers at North Ferry, Boston side, to Rendle & Stoddard, East Boston, Mass., at \$23,602.

**Boston, Mass.**—For rebuilding draw span, pile bridge, etc., at Meridan st., East Boston to Chelsea, to Lawlor Bros., 16 City sq., Charlestown, Mass., \$122,180. Other bids as follows: W. H. Ellis, \$122,284; H. P. Converse & Co., \$132,230; J. T. Scully P. & T. Co., \$133,451; W. H. Keyes & Co., 144,171.

**Middletown, Pa.**—For construction of steel girder bridge across Swatara Creek, to G. W. Ensign, Camp Hill, at \$11,258.

### MISCELLANEOUS

**Pittsfield, Mass.**—City has awarded \$100,000 4 per cent. bonds to R. L. Day & Co.

**St. Louis, Mo.**—St. Clair County Board of Supervisors at Belleville has adopted resolution authorizing erection of new workhouse and appointment of committee of five to investigate feasibility of erecting prison at Falling Springs.

**Marinette, Wis.**—When bids for the municipal dock were opened only two tenders were received. Greiling Bros., Green Bay, tendered \$4,355.70, and Capt. James Johnson \$4,861.14. Contract will be let at next meeting of City Council.

### CONTRACTS AWARDED

**Boston, Mass.**—By City, for removing snow and ice in snow districts Nos. 1, 2, 3, 4, 5 and 6: To Coleman Bros., Chelsea, Mass., for Nos. 1 and 6, at 50 cents per cu. yd. for each district; to Joseph McGreevey, Roxbury, Mass., for No. 2, at 37 cents; to the C. J. Jacobs Co., Roxbury, for Nos. 3 and 5, at 34 cents and 32 cents, respectively. All bids for No. 4 were rejected, and new bids will be asked. The bids on No. 4, opened on Nov. 13, follow: Coleman Bros., 44 cents; C. J. Jacobs Co., 38 cents; Mark H. Lynch, 45 cents; J. C. Coleman & Sons Co., 55 cents; John T. Keogh, 31 cents.

**Omaha, Neb.**—For jail work in new county building, by County Commissioners, to Pauli Jail Building Co., of St. Louis and New York City, at \$50,000.

**Collingswood, N. J.**—By Borough Highway Committee, to R. C. Taylor, Collingswood, for furnishing 7,000 tons of crushed stone, at \$1.47½ per ton.

**Philadelphia, Pa.**—By H. A. Mackay, Director Public Works, for street cleaning and rubbish removal for one year, as follows: To General Mfg. Co., \$420,000. Other bids as follows: Penn Reduction Co., \$510,000, and Frank K. McFarland, \$520,475.

**Philadelphia, Pa.**—For constructing bulkheads along Schuylkill River at Bartram's Gardens, from 53d to 56th st., the lowest bidder was Filbert Paving & Construction Co., for \$256,774.80. Other bids were received as follows: McHarg & Barton, New York, \$268,038; Armstrong & Latta, \$272,428.20; American Paving & Construction Co., \$283,017; J. J. Williams, Chester, \$292,533.40, and John McMenamy, \$305,445.50.

**Richmond, Va.**—By Council Committee on Improvement of James River, to H. M. Allport & Son, of Richmond, for construction of new municipal wharf on north side of river, between Gilles Creek and Nicholson st., at \$23,999.50. Other bids submitted were as follows: Thomas Sheahan, of Roanoke, \$24,315, and Alsop & Pierce, of Newport News, \$23,300.

**Everett, Wash.**—For driving piling to afford protection to Rowen bridge, near Oso, to Shea & McBurney, at \$2,800.

## PROPOSALS

### PAVING

Carthage, Mo.

Bids will be received up to 7.30, Dec. 11, for the construction of 7,000 square yards of asphaltic concrete pavement.

F. B. NEWTON, City Engineer.

Sealed proposals, endorsed "Proposals for a Steel-Concrete Floor, Iron Balcony, Stairs, Railings, etc.," will be received at the Bureau of Yards and Docks, Navy Department, Washington, until 11 o'clock a. m., December 23, 1911, and then and there publicly opened, for a steel-concrete floor, iron balcony, stairs, railings, etc., at the U. S. Naval Magazine, Fort Lafayette, N. Y. Plans and Specifications can be obtained on application to the Bureau or to the Inspector of Ordnance in Charge Naval Magazines, New York district, Iona Island, N. Y.

R. C. HOLLYDAY,  
Chief of Bureau.

Nov. 17, 1911.

22-23.

## FOR SALE

## FIRE APPARATUS FOR SALE

The City of De Kalb offers for sale the following Fire Department Equipment:

### One Combination Hose and Chemical Wagon

Including  
One 40-gal. Chemical Tank,  
200 ft. ¾-in. Chemical Hose with nozzle,  
One 25-ft. Extension Ladder,  
One 10-ft. Roof Ladder with folding hooks,  
Two 2½-gal. Pabcock Extinguishers;

Also  
Lanterns, Torches and the usual tools;  
Capacity of wagon, 1,000 ft.  
2½-in. Cotton Rubber-Lined Fire Hose;

Also  
One Hale Swinging Harness with hangers,  
Two Fire Department Horses, well trained.

This equipment is all in excellent condition, practically as good as new.

For further information

Address **W. A. Criswall, Chairman**  
Fire Committee De Kalb, Illinois

## FOR SALE

Combination Chemical Engine and Hose Wagon. Having purchased Seagrave Fire Automobile, we have for sale Combination Chemical Engine and Hose Wagon. Almost new, equipped with 2 35-gal. Holloway tanks. Will be sold at great sacrifice.

W. G. CALHOUN,  
City Clerk and Treas.,  
Greenwood, S. C.

22-23

## Special Offer

Set of small lettering triangles, one 3½", 30 degrees, and one 3", 45 degrees, of transparent celluloid about 1/16" thick, will be sent postpaid upon receipt of **25c.**

**E. G. RUEHLE & CO.**  
119 Fulton Street, New York City  
Branch: Newark, N. J.  
Factory: Jersey City, N. J.

### SECOND HAND

## TRANSITS and LEVELS

For Sale

Thoroughly overhauled and rebuilt  
Send for complete list

**The ENGINEERING AGENCY, Inc.**  
Monadnock Block - Chicago